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ABSTRACT

One section of this journal is devoted to issues involving broadcast satellites. Separate articles discuss the need for international planning of satellite broadcasting, decisions made at the 1971 World Administrative Radio Conference for Space Telecommunications, potential problems in satellite broadcasting, a series of proposals drawn up by the United States for presentation at the 1977 World Administrative Radio Conference on the Broadcasting Satellite Service, Japan's views on broadcast satellites, Canada's views, and legal implications of satellite broadcasting. Other articles discuss the following topics: India's Satellite Instructional Television Experiment; recent changes in Spanish broadcasting policies; uses of the mass media in promoting adult education in developing countries; a report prepared by UNESCO on the proposed Gulfvision Network; a recent satellite technology demonstration in Cameroun; the new United States copyright law; a project to mobilize folk communication's resources; and teletext systems in operation in the United Kingdom and other countries. Short notes deal with additional topics, including the "family hour" television policy in the United States, financial problems of West German television, and a proposed satellite organization. (GW)

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Tests and Experiments

THE MOST talked-about communications experiment at the moment is India's Satellite Instructional Television Experiment (SITE), as it is generally known. Before judging whether the Experiment was a success or a failure, it is worthwhile reading the 1969 Memorandum of Understanding between the Indian Government and NASA which summarised its main objectives. The Memorandum speaks of gaining experience, demonstrating, stimulating, providing, enhancing capabilities, and so on. It does not mention any hypothesis, or any test of a hypothesis; except NASA's test of the satellite's FM transmitter. Yet an experiment conducted according to the scientific method is usually held to require as a minimum a hypothesis to be tested and a test of truth of the hypothesis. There *were* many tests, of course, but it is perhaps significant that the original agreement appears to stress other objectives.

Researchers in India and elsewhere, moreover, have raised doubts about the relevance and rigour of the tests that were carried out. Some have disputed the choice of research topics. For instance, Mehra Masani, former Deputy Director of All India Radio, has asked in 'Vidura' why are there no cost benefit studies to discover whether the "assumed superiority of TV is worth the extra cost?" Others are concerned about the way the research was carried out. The Commonwealth Broadcasting Association has said that it might have been better to give more research contracts to outsiders, in order to encourage "completely independent judgment". Further concern has been expressed as to whether the various tests are relevant (can be completed in time for) the Government's future plans in the field of telecommunications and education.

SITE undoubtedly produced a mass of data. The difficulty comes in turning this raw data into information that is usable by the Indian Government, NASA, or any other governments and bodies which might need it.

It is possible that SITE's main benefit is not so much the titular Experiment in Satellite Instructional Television but the equally valid experiments in gaining experience and expertise in developing, planning and administering a complex project of space technology.

The European experiments in local cable systems had many of the same qualities. The UK Government, for instance, announced that it would "licence, on an experimental footing, schemes to transmit locally-originated television programmes" in certain areas. But it did not put forward any hypothesis (nor suggest that any were necessary); the regulatory and financial frameworks for the five experiments were identical, making comparisons impossible; and it did not commission any research or mandate the stations to do their own. (The stations did carry out some research, of widely varying content).

The experiments did produce a wealth of data and some immensely valuable experiences for the people involved. But the Government's own view of the experiments seems intended to test not so much any hypothesis about local cable systems as the corporate strategies of the companies involved.

The word experiment has two meanings. The first and older, according to the 'Oxford Dictionary', is "a procedure adopted in uncertainty whether it will answer the purpose". The newer definition, which is more in keeping with scientific method, is "an action undertaken to test a hypothesis". The spin-off benefits of a project which is called an experiment in the first sense of the word are always useful. The direct benefits of an experiment in the second sense, although surrounded with all kinds of methodological and management problems, could be even greater. • JAH

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"PERMISSION TO REPRODUCE THIS MATERIAL IN MICROFICHE ONLY HAS BEEN GRANTED BY International Broadcast Institute TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC) AND USERS OF THE ERIC SYSTEM."

Family Arguments

THE "FAMILY HOUR" policy on US television has been strongly challenged by a Los Angeles judge, Warren Ferguson. The judge found that the policy was largely the result of pressure from the Federal Communications Commission and that those pressures constituted an illegal censorship of television programming.

The judge was ruling on a suit brought against the FCC, the National Association of Broadcasters and the networks by several producers, writers and actors that the "Family Hour" had led to a loss of earnings. The "Family Hour" agreement, introduced in September 1975, held "that any programmes which were inappropriate for viewing by a general audience" should not be shown in the early evening.

Norman Lear, producer of 'All in the Family', claimed that the policy had cost him $10 million. Judge Ferguson agreed that "the syndication value of 'All in the Family' had been significantly diminished by the defendent's conduct". Although he did not specify any injunctions, he said the networks and the National Association of Broadcasters were liable for any financial loss suffered by Norman Lear and his co-plaintiffs.

The judge delivered his 223-page decision on November 4. Its main thrust is that the FCC went far beyond its proper limit in persuading the networks into accepting the "Family Hour". The decision states that "the plaintiffs have evidenced a successful attempt by the FCC to pressure the networks and the NAB into adopting a programming policy they did not wish to adopt. The plaintiffs have proved that the FCC formulated and imposed new industry policy without giving the public its right to notice and its right to be heard".

The court determined that "much of the energy associated with this case has been generated because the plaintiffs and the defendants disagree about the wisdom of the family viewing policy. In the last analysis, however, this is not the family hour case. The desirability or undesirability of the family viewing policy is not the issue.

"Rather the question is who should have the right to decide what shall and shall not be broadcast and how and on what basis should these decisions be made. This court will not evaluate the family viewing policy except to say that the individual broadcast licencees have the right and duty to exercise independent judgement in deciding whether or not to follow the policy. This court has no authority to declare an end to the family hour.

"If the family hour continues, it should continued because broadcasters in their independent judgement decide that is desirable policy, not because of government pressure or NAB regulation. If government intervenes in the future to control entertainment programming on television, it shall do so not in closed-door negotiating sessions but in conformity with legislatively mandated administrative procedures.

"If the government has any power to regulate such programming, it must be exercised by formal regulation supported by an appropriate administrative record, not by informal pressure accompanied by self-serving and unconvincing denials of responsibility.

"In short, the family hour may or may not be desirable. Censorship by government or private created boards cannot be tolerated."

Sifting through the long history of meetings, memos and speeches that preceded the adopting of the "Family Hour" at the NAB convention in April 1975 (applicable to the following season), judge Ferguson had no trouble in detecting this pattern: Congress pressured the FCC, whose chairman, Richard Wiley, in turn pressured CBS, NBC and ABC executives, who rallied the rest of the industry to take action before Congress or the FCC got tougher.

After the decision, the networks said independently that there would be no "specific" or "sudden" changes of programme policy. CBS and NBC quickly said they would appeal.

The FCC, and the CBS and NBC networks, feel they have to appeal to clear themselves of judge Ferguson's charges.

Germany's Money Crisis

WEST German TV is likely to be £200 million in debt by the end of next year. The loss of the first channel (ARD) is put at £130 million; that of the second channel (ZDF) at about £60 million.

Earlier estimates had put the deficit nearer £300 million. Both networks have been fearing a major crisis for some years as the relatively easy 1960s gave way to the inflationary seventies.

Almost all the factors mentioned at a recent seminar held by the European Broadcasting Union on 'The Economic Crisis of Broadcasting Companies' apply to West Germany with particular force. The three major reasons were stated to be *inflation*, which affected all countries and caused a rapid and excessive increase in costs; the difficulty of *adapting income to expenditure*, whether receipts came from licence fees, advertising or other sources; and the stagnation of receipts in those countries which had reached *saturation point* in radio and television receivers.

The huge debt will be greatly eased by a government decision to solve a long-standing tax controversy in the networks' favour. For many years, both ARD and ZDF have been owing 60% tax on income from advertising. It is believed ZDF's tota tax bill was as high as £300 million. The Government has now agreed that the networks shall pay their arrears at the much lower rate of 8%

This arrangement will not solve the long-term problem. Other, more permanent tactics include proposals for a higher licence fee and an increase in the time allowed for advertising from 20 minutes daily to perhaps 30 minutes.

The 1976 income of ARD and ZDF is expected to reach £600 million from licence monies and £200 million from television advertising revenue.

Demand for TV advertising in Germany has almost always exceeded the number of available slots. The deadline for buying time is October 1 of the previous year, and 1977 sold out easily.

EUTELSAT in 1977?

A NEW satellite organisation may be set up next year to own and administer Europe's regional communication satellites. The new organisation will be called Eutelsat in direct counterpart to Intelsat, which operates the international communication satellite system.

Eutelsat was first proposed in 1970 by several European telecommunication authorities (known as PTTs). They believed the existing system of one country operating experimental systems on behalf of the others was going to become unworkable as the projects grew in size and cost. There were clear advantages in having an independent body which, although controlled by the PTTs concerned, would have its own legal status and be able to raise capital and take over the management of space systems.

The PTTs currently coordinate their regional business through CEPT (Conference Europeene des Administrations des Postes et Telecommunications). The Conference does not have a legal status and can neither own property nor raise capital.

The 1970 proposal has been resurrected in light of the European Space Agency's plans to launch its Orbital Test Satellite next year. This experimental project will be followed by the European Communication Satellite for telephone, telex, data, television and other links. Eutelsat will probably work on the same principles as Intelsat, with the European Space Agency acting as manager in technical and operational matters.

Unlike its predecessor, the European Space Research Organisation (ESRO), the European Space Agency can carry out any activity, including launching and controlling satellites, which its members request.

Membership in Eutelsat is likely to be similar to that of CEPT. It could, however, be stretched to include the members of the European Broadcasting Union in North Africa and the Near East, who are outside CEPT; while, on the other hand, it is not clear that all CEPT members will automatically join.

Eutelsat is likely to take responsibility only for regional communication satellites, and not to get involved in national systems or meteorological, etc, projects.

Road Radio

SEVERAL European countries have started special radio programmes to provide drivers with road traffic and weather information.

Many members of the European Broadcasting Union have been considering such a service since 1974 when the EBU standardised a technical system for identifying programmes containing traffic information.

The nine West German Lander (administrative regions) started a traffic and road information service in 1975. It provides a 24-hour daily programme primarily for truck drivers and motorists on holiday. Supersonic tones automatically switch radios to the right frequency for an announcement.

In Austria, the Osterreichischer Rundfunk started an experimental VHF service aimed particularly at motorists on holiday. The ORF coordinated its plans with the ARD, the Swiss PTT, Italy's RAI and Jugoslavia's JRT. It split Austria into four radio regions (which do not match administrative areas) each with its own coded service. The full service started in March 1976 and it is now possible to obtain the special programmes from the north of Germany to the southern borders of Austria.

In the UK the Independent Broadcasting Authority is experimenting with a similar service in conjunction with a London-based commercial radio station. Traffic announcements are made at regular intervals on MW and VHF. Each announcement is preceded by both an audible and a supersonic pilot tone. The latter allows an automatic decoder to re-tune the radio or to over-ride a cassette-player.

The experiment ends this year and the IBA will consider whether each local station should provide such material and make up a service which would be virtually nation-wide.

Dutch Index the Licence

THE DUTCH government intends to increase the TV and radio licenses by a fixed amount each year in order to match expected increases in the cost of living.

The TV and radio licences will be raised to Fl. 114 and Fl. 34.50 on 1 January 1977 and thereafter increased by 5% at the start of every year.

This arrangement is expected to continue until 1981, although Parliament can terminate it at any stage.

Red Cross by Satellite

THE next USA-USSR joint space missions may be a global satellite network to help locate aircraft and ships in distress. Meeting in California in October, NASA and InterCosmos experts agreed that this kind of Red Cross in orbit was one of the favoured projects.

Communication by Meteors

METEOR TRAILS have been harnessed by Western Union in an extraordinary new method of communication. The ionised meteor trails exist in the wake of infalling cosmic debris. They will be used to reflect radio signals from remote US meteorological stations.

Sensors in the 160 remote stations will record snow and rainfall data every 15 minutes and then transmit the data via the meteor trails to antennas in Idaho or Utah for automatic processing.

It is unlikely, of course, that a suitable meteor will be available at the precise moment the station is ready to transmit. The central station therefore scans the atmosphere until it finds an appropriate meteor burst and then triggers the remote station to transmit during the burst's short life of one or two seconds.

As InterMedia went to press, we learned with great sadness of the death of Louis Cowan and his wife Pauline in a fire at their New York flat on 18 November. Louis Cowan, former President of CBS TV and Director of Special Programmes, Columbia University School of Journalism, was a founder and former Treasurer of the International Broadcast Institute.

Jean d'Arcy, Chairman of the Institute, writes of Louis Cowan and his contributions to the Institute in 'IBI News'.

A New Spirit in Spanish Broadcasting

Luis Ezcurra, Subdirector General, Spanish Radio and Television

A NEW FORCE is deeply affecting Spain. It is shaking the foundations of time-honoured institutions, in all parts of the country. Old and noble traditions are mingling with new ideas. This change – the "unfolding of democracy" or simply "apertura" (opening up) – has been immediately reflected in the mass media, which are the major witnesses, and in some senses instruments, of the Spanish political process. The daily press, and even more so the weekly press, reflect it more intensely than other media, doubtless because their freedom of expression was in principle legalised as long as ten years ago by the Press Law of 1966 which was promulgated on the order of the Cortes (Parliament) and the Government. Currently, the free dissemination of information in the Spanish press is almost on a par with that in other countries of Western Europe, and through its daily columns and reviews it has insistently and urgently promoted the democratisation of other institutions.

The same kind of change is also apparent in the cinema and theatre. On the screens and in the plays have appeared and reappeared hitherto forbidden authors, untouchable subjects and new forms of acting. In current slang, "revelation" ("destape") means nudity, which can be total for both sexes when the film scenario or the playwright's text so requires. In the same way as in the press (circulation figures have increased considerably and there are more dailies a and reviews than at any previous time) this new freedom has considerably increased public interest in theatres, cinemas and shows.

Rather cautiously, but inexorably, radio and television has shared in this democratising trend in their programmes and structures.

In competition with Radio Nacional, the State broadcasting network, more than 300 AM and FM sound broadcasting stations of a regional or local nature operate in Spain. These stations function more or less as follows: rather more than a third are operated by private companies, functioning on a strictly commercial basis; another third are run by the Trade Unions and the Movimiento, the official party of the State until the constitutional reform, which will soon be submitted to a referendum; and the rest belong to the Episcopal Commission for Social Communication Media of the Catholic Church.

Restrictions on News

Until a few months ago, all these stations (the private ones as well as those of the Trade Unions, Movimiento and Church) were forbidden to produce general national or international information programmes; contraventions would have been punished by severe penalties. Production was reserved exclusively by law to the news broadcasts of Radio Nacional de Espana, the state network. The main editions of the news broadcasts (14.30 and 22.00 hours) had to be retransmitted by all Spanish broadcasting stations.

Until September only one private network, the Sociedad Espanola de Radiodifusion (which controls a network of more than 40 medium wave and the same number of FM stations, and occasionally obtains national coverage) was authorised to transmit national or international news based on the news previously broadcast by Radio National; and to present news commentaries and interviews in two of its programmes, 'Matinal Cadena SER' and 'Hora 25', without submitting them in practice to the censor.

Since September all broadcasting stations have been able to broadcast general information without censorship or consultation, if they are authorised to do so by the Directorate General of Radio and Television. The only requirements for the permit are professional solvency, a current contract with an news agency, and a minimum number of newscasters relative to the number of programmes that they intend to present. This arrangement is intended to avoid the possibility of local stations with limited resources not being able to transmit adequate information programmes. However, low power stations may link up with those who *are* authorised to broadcast general news.

This system, established under an order issued by the Ministry of Information and Tourism, is only a temporary measure. A draft Statute of broadcast information is being worked out, on the basis of the greatest possible democratic participation, by a committee of managers and directors of privately-owned stations. It is hoped that this Statute will reach the Government before the end of the year.

The news staff of Radio Nacional and, generally speaking, its whole programme department, have also opened up their programmes to the new trend. There are no taboos, no black lists, no severely cut news.

Television is following the same path. It is operated exclusively by Radio-television Espanola (RTVE) which is a centralised public service managed by the General Directorate of Radio and Television. A "centralised public service" constitutes the most undefined of the autonomous bodies under the public sector that are recognised by the Spanish judicial system. Its excessively close links with the State Administration, its limited flexibility and its reluctance to adapt to the social and economic development of the country, make it advisable to establish a new form of regulation in the near future. In fact, this had already been officially announced.

The Royal Decree of 10 October 1976, which was published in the Official State Bulletin on the 18th of the same month, has reorganised the General Directorate of Radio and Television and set up the General Council of Spanish Radio and Television. "As a first step towards the ever increasing participation of society" – the words are those used by the legislator – the sectors that are most

representative of Spanish cultural life will be allowed to be directly involved in this important audio-visual council. In effect, the General Council of Spanish Radio and Television will assess, guide and govern the programmes sent out by the State networks. It also has the function of collaboration with and support for the General Directorate of Radio and Television in any matters connected with the future structure and legal configuration of Spanish radio and television. Both these activities – public participation in both general programme matters and in the future configuration of the RTVE – constitute a genuine new departure in broadcasting policy in Spain. Previously, policy had been worked out and dictated by the Government.

Several influences

The Council consists of representatives of the Government, the Trade Unions, the Institutes of Spain and of Industry, the Royal Academies, the Cortes and the Universities, as well as delegates from the associations of the press, radio and television, public relations, advertising, and the cinema and theatre. The vital influence of this collegiate body on the internal structures of the RTVE, and in particular on its programme planning, is reinforced by the activity of an Executive Committee and various specialised committees. The latter consist of members who do not belong to the Council but represent, "due to their technical abilities and specialised professional prestige, the interests of the State and Society in the wide range of programmes covered by the media of broadcasting and television".

It is still too early to be certain of the practical results of this reform. Nevertheless, the press and television – both critics and viewers – have welcomed the appearance of the provisions leading to reform, and have greeted even more warmly the opening up of the programmes to the current of free information and participation which today animates the Spanish scene, sometimes at the risk of taking up extreme attitudes which are not generally wanted. •

Development is Communication

K A B Jones-Quartey, University of Ghana

THE CHOICES FACED by adult educators and national development planners "needless to guess, lie principally in the areas of politics and economics," said Malcolm Adisehiah in his keynote speech to the Conference on Adult Education and Development held in Dar es Salaam, Tanzania, in July. Dr Adisehiah is the outgoing President of the International Council for Adult Education which organised the Conference.

In the "unnerving circumstances" prevailing in these two areas, said Dr Adisehiah, adult educators had a duty, *first*, "to focus on increased food-grains production", with its necessary sub-productions and operations; *second*, to promote training for the production of essential consumer goods by concentration on cottage and small industries, thus meeting the (socialist) principle of mass-poverty eradication through the ownership and control of the means and factors of production by the people (in their own collectivities); *third*, to motivate the people "to adhere to and adopt the population control programmes devised for their individual and family well-being"; and *fourth*, to promote training for self-employment, especially among the younger generation.

These (and other) tasks were necessary for the amelioration of countries' internal national situations. As for the external politico-economic forces and conditions which affect ordinary people so much, especially in the poor countries, Dr Adiseshiah declared the role of adult education to be one of helping these people to understand the momentous issues involved so that, as voters and citizens, they could take the correct decisions and the correct action on such issues – in short, making the principle of participation work.

Everywhere in the discussions, and in many of the papers submitted, the emphasis returned again and again to these chief concerns: *accessibility; democratisation through participation; method; means* and the *media* of information and instruction. One of the most interesting recommendations of the conference was that numbered 6.1, which read: "While insisting on the need to help the adult to learn in and through his or her own culture, thus enabling him or her to share in and help fashion the growth of that culture, the Conference commends the use also for adult education of more recently introduced means and techniques of communication and learning, such as broadcasting. The Conference [acknowledges the importance] of face-to-face teaching and direct communication between learners themselves, but it also supports the use of combinations of face-to-face teaching with broadcasting and print, both in mass campaigns and for individual learners."

There is an important question here. By what mischance had the factor of communication been left out of the theme and title of the conference? Surely it could not have been deliberately, by conscious thought? For how can you have *development* being achieved by *education* without the instrumentality and instrumentation of *communication*? The answer, of course, is that it is impossible. And paper after paper presented by the expert participants, as well as their later group findings, proved this to the hilt. How else?

The experts had indeed cast themselves in the role of professional jugglers with the balls rising and falling to a pattern: *education-communication-development*, development-communication-education *communication-education-development* up-down, down-up, up-down. And if you converted the juggler's dazzle into a simple, indicative mathematical formula, the result would be equally convincing:

$$E \xrightarrow{C} D$$

Nothing less. And so whether as an essential element, a part of the whole construct, an interlacing filament, or the

mortar between the bricks, communication came in at full status throughout the whole discussion programme – even when it was, so to speak, not mentioned by name. John Bowers, of the Agricultural Extension and Rural Development Centre, Reading University, UK, for instance, called his paper 'Functional Adult Education for Rural People: With Emphasis on the Quality of Communication and the Role of Action-Research and Feedback'. He set out to look "particularly at the communication component of adult education" and offered "some suggestions for improving the quality of communication in rural areas". This was, in fact the burden of his entire presentation. Nsang O'Khan Kabwasa, chairman, and T C Lai, rapporteur, reported that Group 6 on 'Media and Distance Learning' recommended "that governments and international agencies support educational projects for human development which combine the use of broadcasting, print and face-to-face learning". Group 1, on 'Agriculture and Rural Extension' said in one of their findings: "Although face-to-face contact is the best method of reaching rural facilities, distance education should be used where communication systems are developed", and that "use must be made of listening groups or learning groups for the pre-testing of media programmes to provide initial feedback prior to the launching of such programmes".

Other examples abounded. Working Group 2: "Among other measures one can mention the establishment of adult literature series, fixed or itinerant community libraries, radio or TV clubs".

We can now see a common ground of operation in a universal project for human progress. The ICAE *educators* at Dar es Salaam were also *communicators* on the substance of *development* – ideas, facts, knowledge about materials, and skills. Their consciousness of this concomitant role would have pre-empted the necessity for separate identification and definition in their conference theme. IBI *communicators* are also *educators* using their knowledge of facts, ideas, methods and skills to urge and to promote *development*. Thus professional adult educators and professional media people have a joint, inseparable commitment to human development, especially among the less developed of the earth. •

Gulfvision is Ready

An Arab summary of a UNESCO report on the proposed Gulf TV system. The report was written by Hamdy Kandil, O Berglund and A Youssif.

THE GULF IS one of those rare areas of the world which enjoys many elements of integration. In the words of the Third Conference of Arab Ministers of Education in 1968 it shares the "same people, environment, culture, language, history, interests and will".

The Gulfvision Network is not merely a project to install communication circuits; it is a political, cultural and development project. Its "national" significance is its most important advantage, because it will help to bring together the people of the area. It will bind them together and help them enrich their relations with other parts of the world.

Like Maghrebvision, the Gulfvision network is a nucleus and one of the constituents of the global Arab satellite or land-line network. The installation of the Gulf network will help save time and expense, and avoid those errors which might confront the regional network project.

Fundamental Change

The Gulfvision "network" is but a technological medium of communication. It is one aspect of the various coordination activities which will be carried out within the Gulfvision "system". The system aims at coordinating TV cooperation between the countries of the region. It hopes to develop the national television services; boost the exchange of programmes, information and experience; consolidate training, documentation and research; and increase the role of TV in serving development plans in the region, especially those related to education. The system will perform those duties through several units: the Permanent Bureau, the Centre of News and Programme Exchange, The Centre of Joint Programme Production, The Centre of Training, Research and Documentation and the Centre of Technical Control and Operations.

The establishment of this system, which will perform various functions, will in fact provide an organisational framework for various practices already exercised by the TV coordination conferences. It is an expression of the wish of TV organisations in the area as reflected in the recommendations of several meetings.

The system will bring about a fundamental change in broadcasting planning in the Gulf area. It means the drawing up of new policies and plans, the using of new technological facilities and modern systems of administration, and a change in the method, rhythm and system of work. It means producing new programmes, and the start and consolidation of coordination and integration with other communication media as well as other institutions in the society.

Exchanging New Programmes

The programmes to be exchange via the Gulfvision system constitute the target of all the efforts which the system will exert. Therefore, they should be completely new in context and form, of good quality, and suitable to the cultural, educational and environmental situation in the countries of the area. Exchange does not mean that we send to others programmes that have already been produced, but that we will produce new programmes, by new and qualified efficient crews who have the gift of innovation and the ability to understand the needs and tastes of others.

The Gulfvision project is economically feasible for several reasons. The first is the present potential enjoyed by the TV organisations in the area. Secondly, it can exploit, develop and expand the existing facilities (satellite stations, Training Centres, New Exchange Centres etc.) and avoid duplication whenever possible.

Thirdly, it will coordinate or modify projects that are already being planned or carried out (TV complexes, land links, the coproduction centre, UNESCO Roving Experts Team, etc.). The Gulfvision System is economically rewarding because it mobilises different resources (joint productions) and yet divides expenses (training courses, the reception of news packages). The logic of exchange is that "with this amount of money I produce

one programme but I get two, five or six programmes".

From the technical point of view, the implementation of the project is clearly feasible. All alternatives for TV link-ups are either available in the international market or already established in the Gulf area. The present technical specifications and the potential of stations may not be similar, but they will grow and gradually develop until they reach the same standard. The shortage in qualified personnel is an acute problem, but there is still a good chance for the experienced people who are available to carry out this project with a limited period of outside assistance. The Gulf area has already set up several examples of the proposed organs, such as the Gulf News Exchange Centre, and successfully run them. However, we would like to underline the fact that the Gulfvision project imposes major commitments on the broadcasting personnel who will participate in it. The selection of this personnel is a decisive element on which the success of the project depends to a large extent. Therefore it is of utmost importance to train the required personnel who will develop and extend the project.

Seven Participants

The Gulfvision system will comprise the countries participating in the Gulf television coordination; namely, Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, The United Arab Emirates, *plus Iraq*, as proposed by the report.

The Gulfvision system is not an organisation like the regional broadcasting unions and is not entitled to represent its members in other multilateral organisations. It does not represent an isolative deviation from the regional coordination settings, especially those within the framework of the Arab States Broadcasting Union (ASBU). It comprises *only* the Gulf countries.

It is proposed that the System consist of a *General Conference*, which would be the supreme organ of the System, *a Board of Directors*, which assumes the power of the General Conference in between its sessions, sessions, and a *Permanent Bureau*, which is the executive organ of the System (it is proposed to shift the Bureau from Damman to Riyadh).

The General Conference has three permanent committees; namely, the Programmes Committee, the Technical Committee, and the Administrative and Financial Committee. It will achieve its objectives through the following units:

- Programmes and News Exchange Centre (Kuwait)
- Joint Programmes Production Centre (Kuwait)
- The Centre of Training, Research and Documentation (Baghdad)
- The Centre of Technical Control and Operations

As regards the exchange of programmes, the project proposes that the exchange should increase gradually. It gives three examples which can be regarded as three separate stages. The first example is a satellite exchange of special programmes whenever the need arises, plus air-freight exchange. The second example is more frequent satellite exchanges of various categories of TV programmes for about 13 hours per week. The third example is the exchange via satellite of general TV programmes and educational programmes.

Satellite News

The report proposes six 10-minute satellite transmissions per week, to follow the French TV news package or the Eurovision package.

As regards educational television, it proposes to carry out a study on the introduction of pedagogical technology to the Gulf Area; to set up national working committees for pedagogical technology; to produce and exchange educational programmes on unified curriculae; and to produce and exchange literacy programmes.

In the field of training, a new *Gulf Broadcasting Training Centre* is to be established in Qatar. It will handle the training of planners and trainers as well as people in other categories, whether at the centre's headquarters or in the form of decentralised training in different TV organisations. Saad Labib, UNESCO expert on educational broadcasting in the Gulf, has completed a study on this centre which will be published very shortly.

A *Gulf Communication Documentation Centre* will be set up in the United Arab Emirates. A UNESCO expert is being appointed for two years. The Centre will carry out regional and comparative studies and help in developing research units in member stations, laying down and coordination research policies, and setting up a clearing house of information on TV in the area.

Research will be carried out in Iraq's Radio/TV Training Centre.

As for technical matters, the report proposes three kinds of links: satellite links, land lines, and a combination of both satellites and land lines. It is proposed that any selection be based on the volume of exchange and expenditures indicators referred to in the report.

Sharing Policies

The report not only deals with coordination in the field of television, but shows that this coordination will have *direct effects on the strategy of other communication media.* It points out that the preparation for setting up a Gulfvision System provides a good chance for more comprehensive coordination and the development of common policies of communication. The report indicates the possibility of referring the subject to the forthcoming meeting of the Gulf Ministers of Information. This would have several specific aims.

One, the setting-up of National Councils of Communication Policies.

Two, the setting-up of an Information Coordination Council for the Gulf States, with a Permanent Secretariat in the United Arab Emirates which sponsors the Ministers' conference.

Three, the holding of a meeting to discuss the coordination of communication policies in the area, in collaboration with UNESCO.

Four, the feasibility of setting up regional specialised organs for coordination in other fields of communication such as the Gulf News Agency (to be set up in Bahrain) and the Centre of Development Communication (possibly to be set up in Oman).

Five, the consolidation of the present coordination organs such as the Permanent Telecommunications Committee for the Arabian Gulf Area and Sultanate of Oman (Bahrain).

Six, to start coordination with the Ministries of Education in order to form a Regional Committee of Pedagogical Technology or a Centre of Educational TV for the Gulf States. •

Broadcast Satellites

ON 10 JANUARY 1977 the International Telecommunication Union in Geneva will open an international conference which is intended to enable governments to take one of the next major steps in the development of television. It is called the World Administrative Radio Conference for the planning of the broadcasting satellite service in parts of the 12 GHz band (the title is very long, but to omit even one word breeds misunderstanding). The five-week meeting will discuss worldwide planning for satellites to broadcast television direct to homes and community antennae.

Next month's conference is the latest in a long evolving process. The International Telecommunication Union first recognised the possibilities of space telecommunications in 1959 and first allocated radio frequences for space communications (although not for satellite broadcasting) four years later. It was soon obvious that these allocations were not sufficient. In 1971, the ITU's next space conference – the World Administrative Radio Conference for Space Telecommunications (known as WARC-ST) allocated to the space services some further frequency bands including, for the first time, several to satellite broadcasting.

At the 1971 WARC-ST, several States spoke of the need to *plan* the use of these allocations for satellite broadcasting and it was decided at the ITU's Plenipotentiary Conference two years later to hold a worldwide planning conference. That conference is next month's World Administrative Radio Conference on the Broadcasting Satellite Service, known as WARC-BS. The frequencies have been allocated; it is now the time to plan their use. The other significant fact about WARC-BS is that it is worldwide, not regional.

Both aspects have generated arguments in the past and, no doubt, will do so again. The 1977 WARC asks the question – how much should we plan? – with particular subtlety. There is little agreement on the answer. There are other, second-level arguments about the need for a worldwide conference as opposed to several regional ones; say, one in Regions 1 and 3 and another in Region 2 (the Americas).

But the question of planning is the most basic and most difficult conundrum facing both the ITU and its member states.

The case for planning is well-established. The spectrum is a scarce natural resource. Demand for it is increasing: from more countries for more stations; more frequencies; wider bandwidths; different services; more complicated transmission technologies. The geostationary orbit used by broadcast satellites is another limited, natural resource. Some planning is essential if the world's telecommunication authorities, private companies and other users are to share these resources in an orderly and equitable manner. We cannot let the spectrum and orbit be carved up by countries on the principle of first come, first served. That would be intolerable. On page 6, Abderrazak Berrada sums up this case for planning.

Almost everyone agrees on the need for some planning. Indeed, the 1971 WARC decided that countries in Region 1 (Europe and Africa) had to plan satellite broadcasting in the 12 GHz before they could use part of this frequency range (as some want to) for terrestrial broadcasting. So they, at least, have compelling reasons to establish a plan. But forceful reasons for *not* planning or, rather, for delaying, are at hand. Satellite broadcasting is in its infancy. There are some experiments; but no systems are yet operational. Even those who favour planning admit that they do not have all the necessary technical data (such as propagation characteristics). The technology continues to change. So strong practical reasons for delaying are put forward. Moreover, although some countries have an obvious need for satellite broadcasting, most face complex and unresolved questions about both technical matters and programme content.

Some countries are therefore proposing an evolutionary approach. Frank Norwood, Executive Secretary of the Joint Council on Educational Telecommunications, was involved in the USA's preparation for the WARC-BS. His article (page 12) describes the US's proposal for an evolutionary approach – and tells the story of how that proposal was adopted.

Other articles give the Canadian and Japanese viewpoints.

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The Background to Planning

Abderrazak Berrada, Member, International Frequency Registration Board

FREQUENCY REGULATION IS a very complicated matter. It is easy to confuse the allocation of a frequency band to a service with the assignment of a particular frequency to a station and to conclude that the station, or the country under whose jurisdiction it comes, "owns" that frequency. This idea of ownership is widespread amongst the public; but it is wrong.

The distribution of bands of the frequency spectrum among the various services is called "allocation". It is done by World Administrative Radio Conferences (WARCs) empowered to allocate frequency bands to each service; such as the 1971 Space Conference.

The distribution within a given band of the frequencies or channels of a particular service, either to countries or to clearly defined geographical areas, is called "allotment". It is done by an administrative planning conference, either world or regional such as the 1975 LF/MF conference.

The authorisation given to a station to use a frequency is an "assignment". The usage of a frequency with specified characteristics is assigned to a station by the country under whose jurisdiction the station comes, and that country then becomes responsible for that station with respect to other countries. It is this usage which is governed by international regulations.

In assigning a frequency to a station any country must comply with the Radio Regulations and its Table of Frequency Allocations. To establish this Table and bring it up to date, ITU conferences, such as the 1971 Space Conference, allocate frequency bands to each of the radiocommunication services either exclusively or on the basis of sharing with other services with equality of rights or, finally, with rights of different status. Hence the need to have a clear and internationally accepted definition of each service. These definitions, as we shall see in the case of the Broadcasting-Satellite Service, play a highly important role. Within the frequency bands listed in the Table, each country preserves its sovereign right to assign the use of a frequency to a station. It does so by issuing an operating licence, and notifying the International Frequency Registration Board (IFRB).

Full details on the procedures to be followed by the IFRB in formulating its findings and recording a frequency assignment, and on the rights and obligations attached to the usage in question, can be found in Articles 9 and 9A of the Radio Regulations. Though the provisions of these articles are of fundamental importance they are rarely referred to; perhaps this is because of their complexity which is such that only a small band of initiates can find their way through the maze of clauses.

The Radio Regulations do make it clear, however, that apart from cases covered by a plan and those not in conformity with some provision or other of the Radio Regulations, it is the principle of "first come, first served" which prevails.

For a long time attempts were made to find a substitute for this principle which would safeguard the equal rights of all Member countries whatever their importance on the international scene. So far as the Broadcasting Service is concerned, the only possible substitute is planning, which consists in allotting a certain number of frequencies to each country on the basis of the requirements it has expressed but with due regard to the possibilities offered by the frequency band covered by the planning. Planning, however, has always come up against the fundamental difficulty that it is impossible to find an objective method of defining the exact needs of each country.

Failing such a method, one can only fall back on the requirements expressed and it is nearly always difficult, if not impossible, to accommodate them all in the limited spectrum. Furthermore, since a planning conference cannot take into account the date of entry into service of the stations covered by the plan, there are some plans in which the percentage of assignments put into use remains relatively low for a long time after their establishment. This has led some people to conclude that, in certain cases, planning is an inefficient utilisation of the frequency spectrum. This argument may perhaps be valid for certain frequency bands but it cannot be applied to them all. The most that can be said is that planning, at the time it is done, places some restrictions on the freedom of action of heavy users of the spectrum but that, gradually, as the plan is implemented, those users benefit from the order it introduces.

The special nature of terrestrial broadcasting has always militated strongly in favour of planning the distribution of the bands allocated to it. Planning has been attempted several times for this service and though some success has been recorded with low, medium, very high and ultra-high frequencies, the great efforts made some twenty years ago to achieve world planning of HF broadcasting have failed. Despite this bad start, every effort must be made to secure the planning of satellite broadcasting. It is imperative because this service opens up new prospects and because it is necessary to guarantee equality among countries as established by the International Telecommunication Convention of the ITU and by the various decisions of the United Nations.

It is clear that the success of satellite broadcasting therefore depends on international cooperation both within the ITU so far as the technical aspects are concerned and in other international organizations for the other aspects of its operation. •

Extracted from the author's IBI Monograph, 'Frequencies for 'Broadcasting Satellites', first published in 1972. Copies in English and French are still available from the IBI, price £1.00

The 1971 Conference-And Afterwards

Abderrazak Berrada, Member, International Frequency Registration Board

1971

The 1971 World Administrative Radio Conference for Space Telecommunications (WARC-ST) retained the existing definition of the Broadcasting-Satellite Service, which is: "84AP: A radio-communication service in which signals transmitted or retransmitted by space stations are intended for direct reception by the general public".

A footnote was, however, added to this definition to explain that the term "direct reception" encompasses both individual reception and community reception. These two modes of reception were then defined as follows: "84APA: Individual Reception (in the Broadcasting-Satellite Service) is the reception of emissions from a space station in the Broadcasting-Satellite Service by simple domestic installations and in particular those possessing small antennae". Community Reception (in the Broadcasting-Satellite Service) was defined as: "The reception of emissions from a space station in the Broadcasting-Satellite Service by receiving equipment, which in some cases may be complex and have antennae larger than those used for individual reception, and intended for use by a group of the general public at one location or through a distribution system covering a limited area".

The 1971 Allocations

The discussions on the bands to be allocated to the Broadcasting-Satellite Service were the longest, and it was virtually only during the last week that the conference managed to reach even compromise solutions. Generally speaking, leaving aside all non-technical considerations, the need for this service to share frequency bands with terrestrial broadcasting or with other services, added to the fact that we had no experience of such systems actually at work, may justify the distinct reluctance of certain countries to commit themselves on the strength of the results of purely theoretical studies. Furthermore, it would be a delusion to believe that what might be termed "political" considerations played no part in the discussions; the part they played would certainly have been less decisive if the proper solution, in accordance with the principles already defined by the United Nations, had been found for them in time.

The allocation of bands 2.5, 12 and 21 GHz were most complex because the new satellite broadcast services had to share these bands with terrestrial broadcasting and other terrestrial services. Some delegations considered this coexistence to be impossible. It involved satellite broadcasting, terrestrial broadcasting, the Fixed Service, the Fixed-Satellite Service (ie, the Fixed Service using space techniques) and the Mobile Service.

Finding a solution took a great deal of discussion. The problems were considered from every aspect and highly divergent views were expressed. The discussion ended finally in a partial solution. The compromise adopted was to allocate the same bands on a shared basis among all the services concerned, without however making sure that the terms of sharing between these services would be fixed in other articles of the Radio Regulations. Moreover, the services that were allowed to share vary from one Region to another and from one portion of the band to another.

The final result for the three bands, 2.5, 12 and 21 GHz was as follows:

2.5 GHz Band: The band 2,500-2,690 MHz was allocated to the Broadcasting-Satellite Service throughout the world; with the exception of Bulgaria, Iran, Portugal and the USSR for the band 2,500-2,690 MHz, and the Federal Republic of Germany for the band 2,550-2,690 MHz. This service shares the band with the Fixed and Mobile Services or with the Fixed, Mobile and Fixed-Satellite Service, according to region.

12 GHz bands: The band 11.7-12.5 GHz in Region 1 and the band 11.7-12.2 GHz in Regions 2 and 3 were allocated to the Broadcasting-Satellite Service; according to Region, the service shares these bands either with the Fixed and Mobile Services, terrestrial broadcasting or the Fixed-Satellite Service.

21 GHz band: The 22.5-23 GHz band was allocated to the Broadcasting-Satellite Service in Region 3, on condition that the terrestrial services are protected and that the power flux density does not exceed limits. These limits are not specified elsewhere in the Radio Regulations.

There were several proposals to authorize satellite broadcasting in the band 620-960 MHz. A distinction was made from the outset between different ends of the band. Particular interest in one fraction (620-790 MHz) was shown by developing countries, which considered it of great importance; but they came up against vested interests. Intense use (mostly terrestrial broadcasting) is made of a large part, if not all, of this band in certain areas. To permit satellite broadcasting without safeguards would have jeopardized the operation of the existing network of terrestrial stations. The conference nevertheless managed to compromise by authorizing satellite television stations in the band 620-790 MHz on condition that they use frequency modulation and that the power flux density they produce at the earth's surface does not exceed a specified value. These two conditions, designed to ensure the protection of terrestrial broadcasting, were considered by some to be excessively severe.

The allocation of the other frequency bands above 40 GHz to the Broadcasting-Satellite Service on an exclusive basis gave rise to no difficulty.•

Extracted, *above*, from the author's IBI Monograph (see page 9) and, *right*, from his presentation at an ITU Seminar in Kyoto in September 1976.

1977

AT THE 1971 WARC there was some disagreement about whether the next step should be a worldwide planning conference or a series of regional conferences. The countries in Region 1 (Europe and Africa) proposed a regional conference on the band 11.7-12.5 GHz. This band was already being used for experimental TV transmissions and radio relay services. It was argued that a regional conference would best ensure that the development of these terrestrial services did not preclude or hinder the later introduction of satellite broadcasting. But the countries in Region 2 and 3 disagreed and in 1973 the Plenipotentiary Conference voted for a conference of all ITU members.

It may be asked, why plan the 12 GHz band only? What about the two lower frequency bands which the broadcasting-satellite service could use?

The lowest band, 628-790 MHz, would appear suitable for satellite broadcasting only in those countries which do not want it for terrestrial broadcasting or for other terrestrial services. Even in those countries the restrictions necessary to avoid interference to the terrestrial services of other countries are quite severe. So far only two countries, India and the USSR, have shown an interest in the use of frequencies of this order. India carried out its Satellite Instructional Television Experiment on a frequency of the order of 860 MHz, using the ATS-6 satellite. The USSR's STATSIONAR-T satellite network will use a geostationary satellite operating on a frequency of 714 ± 12 MHz to provide television broadcasting coverage within the USSR to community receiving stations.

The use of the band 2,500-2,690 MHz for satellite broadcasting has much wider interest. But it would seem to have application only:

(i) In those areas where the band is not already extensively used for the terrestrial fixed and mobile services;
(ii) in those countries where the area to be served by a single transmission is very large;
(iii) in tropical regions where the high attenuation that may be experienced during tropical rainstorms at frequencies of the order of 12 GHz may be unacceptable;
(iv) for television services where the number of channels likely to be required to serve the countries in a given area is fairly limited (the band will provide only six 30 MHz-wide channels, although of course these can be re-used).

The ATS-6 satellite does carry a transponder which works in the band 2,500-2,690 MHz and is intended for educational television experiments. This band is also the one that appears to be favoured by the countries of South America for educational television broadcasting. No doubt the band may also be used for this purpose eventually in other countries; for example, in those of Africa.

In other parts of the world, the 12 GHz band is considered to be the one in which broadcasting satellites will be developed. In the European Broadcasting Area (part of Region 1), for example, the lower bands are already heavily subscribed and in any case would hardly be adequate to provide each of the many countries of Western Europe with even one television programme. The 11.7-12.5 GHz band, on the other hand, can provide four television programmes to each of the countries of Western Europe (although no decision has yet been taken as to whether that would be the basis on which the band would be planned for that part of Region 1). On the other side of the world, Japan is planning television broadcasting experiments from a satellite operating in the frequency band 11.7-12.2 GHz

The present indications are, then, that there is worldwide interest in the use of the 12 GHz band (11.7-12.2 GHz in Regions 2 and 3 and 11.7-12.5 GHz in Region 1) for satellite broadcasting, and that for this reason a frequency assignment planning conference for this band is essential. On the other hand, the use of the lower frequency bands (2.5 GHz and 700 MHz) for satellite broadcasting is likely to be more limited and restricted to certain areas of the world. It would seem that this use might best be provided for by the coordination procedures laid down in the Radio Regulations rather than by a frequency assignment plan. •

The Agenda for WARC-BS 1977

The agenda of the World Administrative Radio Conference for the planning of the Broadcasting Satellite Service in the bands 11.7-12.2 GHz (Regions 2 and 3) and 11.7-12.5 GHz (Region 1), to be held in Geneva on 10 January 1977, is:

1. to establish the sharing criteria for the bands 11.7-12.2 GHz (in Regions 2 and 3) and 11.7-12.5 GHz (in Region 1) between the broadcasting satellite service and the other services to which these bands are allocated, namely:

- *the fixed service;*
- *the mobile service (except aeronautical mobile);*
- *the broadcasting service;*
- *the fixed-satellite service (space-to-earth) in Region 2;*

2. to plan for the broadcasting-satellite service in the above-mentioned bands in accordance with Resolution No. 27 of the Plenipotentiary Conference (Malaga-Torremolinos, 1973) and Resolution No. Spa 2-2 of the World Administrative Conference for Space Telecommunications, Geneva, 1971;

3. to establish procedures to govern the use of these bands by the broadcasting-satellite service and by the other services mentioned in point 1 above to the extent considered necessary by the Conference.

The Allocations Made at WARC-ST 1971

<table>
<tr><th>Region 1</th><th>Region 2</th><th>Region 3</th></tr>
<tr><td rowspan="2">11.7 – 12.5 GHz
Fixed
Mobile except aeronautical mobile
Broadcasting
Broadcasting-Satellite</td><td>11.7 – 12.2 GHz
Fixed
Fixed-Satellite (Space-to-Earth)
Mobile except aeronautical mobile
Broadcasting
Broadcasting-Satellite</td><td>11.7 – 12.2 GHz
Fixed
Mobile except aeronautical mobile
Broadcasting
Broadcasting-Satellite</td></tr>
<tr><td colspan="2">12.2 – 12.5 GHz
Fixed
Mobile except aeronautical mobile
Broadcasting</td></tr>
</table>

Footprints and Spillover

RDA Maurice

A BROADCASTING SATELLITE service differs from a fixed satellite service in several significant ways. The most obvious, perhaps, is that a broadcast satellite will transmit to small, cheap antenna one-fifth the diameter of a regular Intelsat Earth station, or even smaller. This basic difference in diameter has several important consequences.

The area illuminated by a broadcasting satellite's transmissions (known as the "footprint") will seldom exceed two million square kilometres in temperate zones and about 700,000 square kilometres in tropical zones. The difference is mainly due to the variations in rainfall. Rain severely attenuates radio waves oscillating at the super high frequencies (12 thousand million cycles a second, or 12 gigaherz) envisaged for satellite broadcasting. One footprint would therefore cover not more than a fifth of the USA's 9.3 million square kilometres, and would cover an even smaller area in the tropics.

The wattage per square metre (or power flux density) that a broadcast satellite delivers within its footprint is, however, significantly greater than that laid down by an Intelsat or similar fixed communications satellite. Its larger power could cause major interference to intercontinental telephone, telex, data and television signals. Fortunately, these fixed services use a different frequency band (2.5 GHz) to that in which the broadcast satellite services will take place (11.7 GHz and above).

Other fixed services, however, do hope to use the 11.7 GHz broadcasting band. Several countries, particularly the USA, are are considering the idea of commercial fixed services sharing it and in Europe the terrestrial services want to share it. The USSR wishes to use it for telephone circuits using some present-day technology (frequency-division multiplex and frequency modulation) which is particularly vulnerable to interference from satellite broadcast signals. Broadcasters themselves wish to use the band for terrestrial links between outside broadcast sites and studio centres, and between studio centres and terrestrial transmitter sites. The various arguments fall into several schools of thought: some wish to use the band exclusively for satellite broadcasting; others wish to use it exclusively for terrestrial services; and the issue is further complicated by those who want to use it for the fixed services by satellite.

In 1971 a World Administrative Radio Conference adopted the inevitable compromise of allocating the band, on a sharing basis, to all three types of service; terrestrial, fixed (satellite) and broadcasting (satellite). The task of the 1977 WARC-BS will be to see how best the compromise can be put into effect.

It may well be asked "why hold a conference so soon when it appears unlikely that many countries will want to avail themselves of a satellite broadcasting service?" Certainly, it is doubtful whether many countries in Europe or in North America are in urgent need of such a service. Their populations are rather well served by existing terrestrial broadcasting and the demand for more programmes, except for local ones, seems minimal. But developing countries that have not already expended the vast capital required for a terrestrial broadcasting service might well consider that a satellite service would, in the long run, be more economic. By and large, it would cover an entire country or service area in one operation, thus avoiding the extremely expensive task of reaching the isolated pockets of population that are inevitably left out of the first phase of terrestrial transmitter building. Nevertheless, the expense of instituting a satellite broadcasting service would be a heavy load on the finances of a developing country. So, once again, we may ask "why come to a decision as early as 1977?" The answer is, "Because the pressure from fixed satellite and terrestrial services is great, and if there is no detailed plan for broadcasting, then the band will be filled with the fixed and terrestrial services and they will pre-empt it, thus rendering unlikely the future use of the band for broadcasting".

So, we arrive at a situation in which a detailed plan for broadcasting will enable the fixed and terrestrial services to plan their activities in such a way that they avoid prejudicing the future use of the band for broadcasting and everyone will be happy; in spite of the fact that satellite broadcasting will probably not become operational for some years to come.

It is interesting to note, however, that Japan is well advanced in its plan to launch an experimental broadcasting satellite in 1978, and Canada already has the Communication Technology Satellite in orbit and is conducting experiments that include community reception. India's Satellite Instructional Television Experiment, of course, has just finished. Community reception, because of the use of antenna somewhat larger than those required for domestic reception, requires a somewnat lower power from the satellite transmitter.

Whether or Not to Plan

Several countries do feel the need for a plan. The USA, however, has no wish, at present, to consider the domestic reception of satellite broadcasting, even though there is some pressure for the fixed services to use the 12 GHz band and also, possibly, for broadcasting for community reception. These considerations have influenced US thinking in a direction which is opposed to the establishment of a hard-and-fast plan for broadcasting. The Americans point out that a significant amount of the information required for the establishment of a plan is lacking. For instance, information about the statistics of rainfall, such as histograms showing the rainfall at each hour of the day in many regions of the Earth, is incomplete. Also, the technologies of satellite antennae; satellite transmitter powers; the efficiency of solar arrays or panels that will supply

primary electric power to the spacecraft and its transmitter – all these things will, no doubt, progress. Many people argue that by the time there is a real, urgent demand for satellite broadcasting services, the technology upon which an *a priori* plan will have been based will be out of date.

While recognising the truth of the US view, many countries still favour an *a priori* plan. They fear that America's evolutionary method would lead to the pre-emption of the 12.7 GHz brand by the terrestrial and fixed services and the exclusion of broadcasting. They also point out that many frequency allocation plans have been made by the ITU in the past without what, at the time, was considered to be adequate technical data and that, by and large, these plans have stood the test of time; and that, in any case, any plan is better than no plan.

The debate continues. At the time of writing (September, 1976) the American view seems to be a minority one. Certainly the view of the European Broadcasting Union (EBU), along with that of USSR and probably China, is in favour of *a priori* plan. The Asian Broadcasting Union (ABU) has not, as yet, come to a conclusion, but many of its members favour the *a priori* case. The attitudes of South and Central American countries are not yet clear. The Arab States Broadcasting Union has also not yet committed itself to any firm principles.

A Two-Level Compromise

A possible outcome of the 1977 WARC is a sort of two-level arrangement. The conference might agree on *a priori* plan covering ITU regions 1 and 3 (ie, Europe, Africa and all the USSR, and Asia and Oceania) coupled with a list of technical guide-lines, limits and tolerances, but no definite and detailed plan, for ITU Region 2 (the Americas). Such a result would probably be quite workable in view of the large ocean distances that separate Region 2 from Regions 1 and 3.

There might be a problem of interference between satellites serving parts of West Africa (Mauritania, Senegal, Gambia, Port Guinea, Guinea, Sierra Leone, etc.) and those serving eastern regions of Brazil. The longitude of West Africa reaches about 17° west and that of Brazil starts at about 35° west. For reasons connected with the equinoxial eclipses of geo-stationary satellites, it is necessary to site such satellites at about 15° west of the westernmost part of the country to be served. Thus a Senegal-serving broadcast satellite would be situated on the equatorial orbit at a longitude of about 32° west and, therefore, almost over eastern Brazil. Special care would be needed to ensure that the Senegal-aimed transmitting aerial did not radiate too much "leakage" power from its "side lobes" into Brazilian territory. There are several possible solutions to such a problem, however, and both frequency discrimination and antenna directivity could be called in aid.

Computer Programmes and Spillover

The EBU has several computer programmes which are capable of processing the enormous amount of data necessary for the establishment of a Regional or a World-Wide plan and the ITU is preparing similar computer programmes for the 1977 Conference. The only information that a country must supply to the conference is, first, the latitudes and longitudes of the apexes of an irregular polygon that is a best-fit circumscribing figure to its geographical shape and secondly, the number of satellite broadcast programmes it would like to have. The draft experimental plans that have been constructed so far have considered five programmes per country as being a both reasonable and feasible number; but both smaller and larger numbers can be accommodated and it is neither necessary nor desirable that all countries, large and small, should ask for the same number. The plans also take account of the possible desire of some groups of countries that have a common language and similar cultures to accept not only each others' "spillover", but to share beams, so that every part of several countries can share the same programme at the same time.

Accepting spillover may be desired by Switzerland in conjunction with the Federal German Republic, Italy and France, and there are, no doubt, other examples in Europe if not elsewhere; while the Scandinavian countries, and the UK and Eire, may wish to share programmes.

Programme-sharing plans require the various satellites to share a given orbital position. All the domestic antennae in the sharing countries are then able to point not only to their own country's satellite but also to the satellites of other countries whose programmes they wish to view. The pointing accuracy required to keep a satellite in view is so high (0.5°) that domestic dish antennae must be securely fixed and will not be adjustable at the whim of the viewer.

The wish of some countries to *avoid* spillover can be satisfied by using both frequency and pointing angle discrimination (antenna directivity in both the satellite transmitter and the antenna receiving installation), and by using orthogonal polarisations. A domestic antenna designed to be capable of being switched to either of the two possible orthogonal polarisations would cost a good deal more than a single, fixed polarisation aerial.

This raises many questions of economics. The cost of a satellite broadcasting system, including the cost of the up-link Earth station required to "beam" the programme signals to the satellite, is a most complicated subject and quite beyond the scope of the brief article. A figure of $250 million is probably an underestimate. •

USA Offers Evolutionary Planning

Frank Norwood, Executive Director, Joint Council on Educational Telecommunications

AT THE 1977 World Administrative Radio Conference (WARC) on Broadcasting Satellites, the United States will put forward a series of proposals which it believes will promote the fullest development of the 12 GHz band and insure maximum flexibility for future systems design while, at the same time, preserving access to the geostationary orbit for all potential entrants through the end of this century and beyond. The USA believes that to make too many decisions now would be premature, and that decisions which close options at this early date would eventually be regretted by all parties as having committed us to measures later revealed to be wasteful of our common resources of spectrum and orbit.

With its experiments on NASA's Applications Technology Satellite-6 (ATS-6) and the joint US-Canadian Communications Technology Satellite (CTS), the USA has more firsthand experience with broadcasting satellites that any other nation. It is quick to recognize, however, that this is a new communications medium, distinct from anything that has gone before, and that the needs for and potential applications of broadcasting satellites cannot yet be perceived in any realistic terms. By the same token, satellite technology – including space hardware, launch capability, Earth station simplification – promises to develop so rapidly that decisions based upon the present or projected state of the art might soon prove to be as shortsighted as would having locked ourselves into world television standards based upon the use of the Nipkow scanning disc.

The USA rejects both the prospect of a rigid approach based upon *a priori* decision-making and the equally unwise *laissez faire* idea of "no advance planning" which would provide free development of satellite communications but at the intolerable price of permitting the earliest entrants to squander communications opportunities to which others have equal rights. The USA terms its approach, "evolutionary planning". It only goes so far as our present limited knowledge makes appropriate, and protects our common options for the future through the implementation of safeguards, including attention to a number of "sharing principles" which will allow fuller utilisation of the spectrum/orbit resources as broadcasting satellite technology develops.

The US proposals, discussed in more detail below, are best understood in the context of national and regional differences which engender in the USA an outlook unlike that which may shape the thinking of administrations in Asia, Africa and Europe. While the focus of the 1977 WARC is on the broadcasting satellite service in the 12 GHz band, in Region 2 (North, Central and South America) the space allocation of this band is to both the fixed satellite and broadcasting satellite services on a co-equal basis. The contrast is clear. In Region 1 the band 11.7–12.5 GHz (a full 800 MHz) is allocated to the fixed, mobile (except aeronautical mobile), broadcasting and broadcasting satellite services. In Region 2, however, the 500 MHz from 11.7–12.1 GHz must accommodate, as well as these four, the fixed satellite (Space-to-Earth) service. What the division between these services should be, and how it should be accomplished, are issues at the heart of the matter.

Further contrast is found by comparing the countries within each region. Region 1 has some eighty-eight countries, many of them geographically small and sharing common borders with several neighbours. Region 2 has only about thirty countries and a number of them extend across large areas with as many as seven time zones. In Region 1, several administrations are anxious to develop terrestrial services within the 11.7–12.5 GHz band. They are eager to establish firm regulations for space applications in these frequencies (which the 1971 WARC made a pre-condition of terrestrial broadcasting) so that they can get on with the business of setting up terrestrial services. In the Western Hemisphere, however, both Canada and the United States plan to suppress terrestrial services in the band. Other Region 2 administrations, moreover, have not fully utilized the available and more desirable lower frequency bands for their ground services.

The need to accommodate both the Broadcasting Satellite Service and the Fixed Satellite Service within the 500 MHz available in Region 2, the ability to plan space services with fewer constraints imposed by terrestrial services in the same band, and the fact that Region 2 touches Region 1 and 3 not over land masses but at mid-oceanic points, suggest that if necessary a unique approach can be taken in Region 2, with minimal impact upon Regions 1 and 3.

While the major problem in other regions may appear to be the division of the spectrum and the orbit between the various broadcasting satellite services, in Region 2 the more basic issue is the way in which these resources are partitioned between fixed satellite and broadcasting satellite services.

Early Signs

There is little experience to provide a guide for the making of wise decisions. The experimental broadcasting satellites ATS-6 and CTS can give us only early signs of what shape an emerging service may take in this part of the world. In the United States, one application from a domestic satellite common carrier, Satellite Business Systems (the IBM/Comsat General/Aetna Insurance joint venture) proposes fixed service satellites in this band with digital service directly to the premises of the end-users. Making haste slowly appears to be the order of the day.

What decisions will maintain the maximum degrees of freedom? The USA proposes that orbit division, rather than

frequency division, be employed. In the latter case, part of the band in Region 2 would be assigned to fixed service satellites, and part to broadcasting satellites. The unanswerable question is how much spectrum will be needed by each service? Frequency division imposes a severe economic penalty, in that excess traffic in one service requires the launching of a new satellite, even though there may be unused frequencies in another portion of the band. A better approach, the USA will suggest, is to allow any satellite, whether broadcasting or fixed, to utilize the entire 500 MHz the band affords. In the near term, launch vehicle constraints may prevent the development of a single satellite capable of using so much spectrum. Multiple satellites might then share an orbital slot and bandwidth. In both cases, the principle of orbit division remains valid, allowing each of the space services access to the total available spectrum allocated and to the available service arc in Region 2.

How the USA Prepared for the WARC

Before discussing the US proposals in detail it is worth noting that the process of preparing for a World Administrative Radio Conference is undertaken in the United States in a manner which offers some sharp contrasts with the scenarios in other nations. For many administrations, preparations for a WARC are the sole responsibility of some government agency, such as the Ministry of Posts and Telecommunications. In the United States, both government and non-government inputs are sought. The White House Office of Telecommunications Policy has the nominal responsibility for collecting and coordinating the views of a variety of *government* agencies through the mechanism of the Interdepartmental Radio Advisory Committee (IRAC). At the same time, the Federal Communications Commission (FCC), an independent regulatory agency created by the Congress in 1934, provides the channel by which *those outside Government* may participate in the planning process.

Participation by non-government entities is no mere charade. On 30 April 1975, the Commission instituted its 'First Notice of Inquiry' relating to the preparations for the 1977 World Administrative Radio Conference on Broadcasting Satellites' (Docket No. 20468). In accord with regular FCC practice, comments were invited from all interested parties and an opportunity offered for rebuttal and reply.

The Commission also established a Joint Industry/Government Committee (JI/GC), as required by the Federal Advisory Committee Act. The committee was composed of interested parties from within and without government, and its meetings were – by law – open to the public. Six working groups were established and given alphabetical designations: Working Group A: *Definitions and Terminology;* WGB: *Sharing Principles;* WGC: *Sharing Criteria;* WGD: *Evolution and Requirements;* WGE: *Non-Technical Implications;* and WGF: *Procedures.*

Although called "industry-government committees", their actual composition included representation of a wider variety of interest including, in key assignment, representatives from the Corporation for Public Broadcasting, the Joint Council on Educational Telecommunications, the Public Service Satellite Consortium, and other interested parties which are neither "industry" nor "government". Government participants included the National Aeronautics and Space Administration and the Department of Health, Education and Welfare, as well as the FCC itself.

After a 'Second Notice of Inquiry' the FCC policy proposals were coordinated with those of the Interdepartmental Radio Advisory Committee and the resulting document transmitted to the Department of State with the joint recommendation that it be sent to the Secretary General of the ITU as the formal proposals of the United States for the 1977 World Administrative Radio Conference on Broadcasting Satellites.

The FCC's final 'Report and Order' (Docket No. 20468) not only presents the conclusions reached and the arguments which support them, but reviews in considerable detail the debate by which they were derived. Because the US process of developing WARC recommendations is so open to public view and participation, recapitulation of the sometimes heated dialogue often illuminates the processes by which the final recommendations are arrived at and provides genuine insights into the communications structure of America.

The prospect of direct-to-home satellite broadcasting is, in the United States, an issue with more than its fair share of emotional charge and controversy. In nations where there is a single established broadcasting agency, whether or not that agency is the government itself, broadcasting satellites may be seen as little more than a new and perhaps better tool for carrying out an established mandate. In the USA, commercial stations affiliated with the major networks see clearly that direct-to-home broadcasting satellites could make their relationship to the ABC, CBS and NBC networks obsolete. On the other hand, the networks' own response is leavened by the fact that each owns its share of TV broadcast stations; it is the ownership of local stations in the major markets which makes the greatest contribution to corporate profits. Further, the establishment of new national commercial networks of terrestrial TV stations is highly unlikely, but direct broadcasting satellites could clearly make new "instant networks" technologically and economically feasible.

Localism is Important

The most important considerations, however, are not those of vested interest and private profits. To a far greater extent than is generally recognized, the principle of "localism" has had a central place in American communications policy since the beginning of broadcasting. The Federal Radio Act of 1927 placed great stress upon geographic diversity and local service, including the moving of stations from one zone of the country to another. Television channels are authorized under a "Table of Allocations" designed to prevent the clustering of stations in the major cities with no channels left for smaller towns and rural areas.

It is true that most American television stations devote only a small portion of their broadcast day to programmes which they themselves produce But the significance of local programming is proportionately much greater. Local news is almost always among a station's most viewed – and most profitable – programming. With the decline in the number of daily newspapers in the United States, local TV news coverage is of increasing importance.

In point of fact, it seems unlikely that the United States will develop direct-to-home broadcasting satellites for the kinds of mass-appeal programming which make up our present television fare. The existence of an extensive terrestrial service, and the fact that it has room for further expansion in the UHF band, makes the prospect of direct-to-home services for the general public less attractive in the USA than in countries with only a limited TV service. Direct-to-home services in this country are most likely to serve specialised purposes and to be directed at the educational and information needs of such target audience as medical specialists, adults seeking continuing education, and the like. Such services cannot be clearly identified at this time, but are likely to evolve from present experiments and future operational experience with broadcasting satellites for community reception.

The ITU Radio Regulations encompass broadcasting satellites of two kinds. While technological limitations constraining both space hardware and launch capability make broadcasting satellites for *individual reception* unlikely for another decade, broadcasting satellites for *community reception* already exist in experimental form.

The Different Meanings of Community

Although presently available, the technology of broadcasting satellites for *community reception* provides some troublesome problems of definition within the United States. Ironically, it was the USA which successfully proposed the concept in its recommendations for space allocation of the 2.5–2.69 MHz band at the 1971 WARC. The original US proposals called the intended service "distribution satellites" and specifically urged that it be established to permit non-entertainment programming in education, health-care and other areas to be distributed to schools, hospitals, and community centres for group viewing and to cable television systems, broadcast stations and Instructional Television Fixed Service installations for relay to viewers in their own homes and at other locations. To Americans, the distinction between "distribution" and "broadcasting", and the differences of both from fixed services, seemed obvious; but in other languages "rediffusion" spans both broadcasting and the proposed "distribution" satellites. As a result, the service concept was adopted, but defined by ITU as a type of broadcasting satellite service.

Now, in America, there is a growing debate about what services broadcasting satellites and community reception may provide. The Corporation for Public Broadcasting and the Public Broadcasting Service (PBS) have placed before the FCC a well-developed plan to distribute PBS and other programming to public television stations via Western Union's Westar I satellite – a service clearly within the parameters of the fixed satellite service. Home Box Office , the pay television subsidiary of Time-Life, is already using RCA's Satcom satellite system to distribute pay-TV across the country. Like Western Union's, RCA's domestic satellite systems is in the 4 GHz fixed satellite service. The emerging Public Service Satellite Consortium is exploring the feasibility of developing a satellite-based Continuing Education Network, aggregating the recurrent education needs of a wide spectrum of professional and other groups and leasing a transponder on an existing domestic (Fixed Service) satellite to enable professional societies and other entities to serve the educational needs of their members across the country. The delivery of the continuing education programmes to their intended audiences would be accomplished by a variety of media including cable, broadcasting, ITFS, the new Multipoint Distribution Services and, perhaps, direct reception in hotels and other public places. This, too, is in the fixed satellite service.

Two things are unclear. The first is which, if any, of these proposed services should also be permitted within the broadcasting satellite service of *community reception.* Are medical specialists "a group of the general public"? Is cable transmission, or rebroadcasting the signal via terrestrial television, "a distribution service covering a limited area"? The Joint Council for Educational Technology (JCET) has argued that the broadcasting satellite service of community reception is, in essence, a new service which exhibits some of the characteristics of broadcasting and some of multi-point distribution. The fact that the 11.7–12.2 GHz band is allocated in Region 2 to both the fixed satellite service and the broadcasting satellite service may reduce the pressure for honing such definitions to a fine edge at this time and in the arena of the 1977 WARC.

Joint Government/Industry Working Group A (Definitions and Technology) concluded that "community reception is a unique international classification, which includes services which will be regulated domestically as both broadcasting and fixed." The Federal Communications Commission agreed with the JCET statement that "applicability of these terms within the USA is subject to appropriate regulatory proceedings and that they are not pertinent for discussion at WARC 1977."

Even though the USA will not bring to the WARC such definitional problems, the argument does illustrate the fact that the future needs for and applications of the broadcasting satellite service are still but dimly perceived – further evidence that a flexible, evolutionary approach to satellite planning is in order.

Such flexibility can be promoted by the application of a number of planning principles explored by JG/IC Working Group B, whose responsibility was to study orbit snaring methods and orbit use principles. JG/IC WG-B considered and rejected the spectrum sharing approach on the grounds that we do not yet have enough experience to make the appropriate division of spectrum between the two services. More important is the fact that, for a given traffic flow, once that flow exceeds the amount that can be accommodated by the assigned share of the band, another satellite becomes necessary. The orbit division approach permits an equally high or higher orbit/spectrum utilisation and imposes no such economic penalty.

Section 2 of the WG-B report considers the sharing principles which would complement an evolutionary approach: "An important fact to be noted is that, as some sample calculations will show . . . the capacity of the spectrum-orbit resources does indeed exceed the most liberal estimate of need and demand for the next decade or two. This, however, is true only if many of the schemes for increasing spectrum-orbit utilisation are implemented. Since it is expected that satellite systems, both broadcasting and fixed, in the 12 GHz band will come into being gradually, it is imperative to design and establish them in such a way that these schemes can in fact operate in the future even though, initially, they may not be

necessary because of the small number of systems in being."

If the principles envisaged by WG-B are implemented (see box) the capacity of the 12 GHz band is likely to exceed Region 2's collective needs for the foreseeable future. Recognising the fact that many administrations, viewing the limited resources of the 4 GHz band, have been concerned that there may develop a shortage of orbital slots, the JCET urged that these sharing principles be incorporated in the ITU Radio Regulations. If they are followed, the capacity of the 12 GHz band is so great as to give assurance to the most concerned nation that there is ample room for all and that the developed nations neither will nor could pre-empt the spectrum to the disadvantage of smaller nations.

The capacity of the band is impressive. Working Group B, using assumptions, data, and techniques from E E Reinhart's 'Orbit-Spectrum Sharing Between Fixed-Satellite and Broadcasting-Satellite services with Applications to 12 GHz Domestic Systems' (Santa Monica: Rand Corporation, Report R-1463-NASA, May 1974), produced a table describing the number of satellites and satellite channels which could be accommodated in the orbital arc and made useful for Region 2. Eight different cases were considered according to whether the broadcasting service is to individual homes or to community receivers, whether the fixed satellite service is to large Earth stations with 10 or 5 m antennas, and whether or not the broadcasting satellites use the cross-polarisation that was assumed for those of the fixed service. In each of these cases, varying estimates of capacity were made according to whether 25%, 50% or 75% of the orbit was allocated to the broadcasting satellite service.

With the broadcasting satellite segment divided equally between high power satellites for individual reception and medium power satellites for community reception (and with co-polarisation), WG-B concluded that the orbit has a capacity of a minimum of 301 broadcasting TV channels and 90 fixed service satellites operating into 5 m antennas and having a total capacity of 864,000 voice channels. On the other hand, if the mix is made of equal allocations for broadcasting satellites of the community type and fixed satellites designed to work into 10 m antennas (and assuming cross polarisation), the arc will accommodate 131 broadcasting satellites with a total of 2,358 TV channels. At the same time, 87 fixed service satellites could provide almost 1.25 million voice channels.

These numbers are critically dependent upon the use of such sharing principles as satellite pairing and cross polarisation. In practice, other considerations such as the limitations on the service arc due to the geography of the terrestrial areas to be served may reduce these numbers. Conversely, the use of other principles not applied in WG-B's calculations could result in greater capacities. One such principle is the use of crossed-beam geometry which would prohibit adjacent satellites from serving adjacent or overlapping areas.

The principle conclusion to be drawn, however, is that our common orbital/spectrum resources are surely more than ample to meet any demands which are likely to be imposed for many years to come – if they are properly husbanded through the use of careful planning. Thus, the 1977 WARC need not become a mad scramble to "get while the getting's good."

Because there is concern among many who have not examined the matter of orbit/spectrum capacity, and who still believe that we must all compete for our share of a scarce resource, the JCET has urged that the USA support the inclusion of these sharing principles in the ITU Radio Regulations. Others argue that these are not, in themselves, regulatory matters but are the consequences of systems models based upon systems characteristics, environment and

US Principles for Sharing

The second working group of the Joint Industry/Government Committee discussed "Sharing Principles". It produced eight main proposals.

Maximum Flexibility – System Characteristics: *No limits on such factors as power flux density nor lower limits on the size of earth station antennae should be imposed until the necessity for such limits has been demonstrated. On the other hand, restrictions on satellite antenna side-lobe characteristics may be established, since they do not seriously constrain system design and are necessary to insure good spectrum/orbit utilisation.*

Maximum Flexibility – Orbit Apportionment: *Until relative need and demand can be ascertained, maximum flexibility should be maintained with respect to the apportionment of the orbit between broadcasting and fixed satellites.*

Orthogonal Polarisation *should be used to decrease mutual intereference. When combined with frequency interleaving, it can provide enough discrimination to permit reuse of the frequency band in the same service area.*

Frequency Interleaving: *The technique of offsetting the carrier frequencies of one set of transponders halfway between the carriers of another. (The RCA Satcom satellite uses orthogonal polarisation and frequency interleaving to provide twenty-four transponders in the same 4 GHz spectrum in which the other US domestic satellites provide twelve.)*

Crossed-Path Geometry: *The principle proposed here is that adjacent satellites should serve areas separated by at least one other service area. It may not always be possible to apply this principle in regard to the fixed satellite service, but its application to the broadcast satellite service appears appropriate.*

Paired Service Areas *can permit the doubling of the total number of satellites if areas in the northern and southern hemispheres are served from the same or adjacent orbit locations. Arranging service areas in sets of three appears possible, and could lead to further spectrum/orbit utilization.*

Clustering *would put all satellites with similar characteristics in the same part of the orbit. (The Canadians are expected to offer some proposals along this line for orbit division.) Putting satellites with similar characteristics close together promotes better orbit utilisation and is never far from optimum.*

Equitable Sharing of the Burden: *The problems of accepting interference should not fall more upon one party, or one type of service, than upon others. In terrestrial matters the USA has typically used the "last man in" approach in which the latest comer must accept such interferences as is already present and provide adequate protection to those already in service. "Equitable sharing" would divide the burden between new and existing services.*

service requirements. The basic principles have been incorporated in the ITU's CCIR Document 11/220 (Rev. 1) where – so many argue – they properly belong. As technology advances and/or our experience reveals differing service requirement, these technical parameters can be reconsidered and revised by the CCIR more readily than ITU regulations can be changed.

What the USA will propose at the 1977 WARC is that the following text will be added to the Radio Regulations:

"Efficiency of Spectrum and Orbit Utilization:
When planning space stations on geostationary satellites in the 11.7-12.2 GHz band (11.7-12.5 GHz in Region 1), all available techniques shall be used for achieving spectrum and orbit utilisation with particular attention being given to the methods described in the applicable CCIR documents."

It will also be proposed that illustrative examples be added to Appendix 30. Joint Government/Industry Committee Working Group C also considered sharing criteria.

Working Group D dealt with "Evolution and Requirements" and explored the present and potential need for broadcasting satellite services of both the community reception and individual reception modes. As discussed above, direct-to-home broadcasting satellites do not appear to be a near term likelihood in the USA although all participants in the US preparations for the 1977 WARC recognised the potential importance of such satellites for other nations. No reservations about direct-to-home services in the United States were intended in any way to inhibit the development of such services by other administrations.

Working Group D did find strong indications of a need in the immediate future for a satellite service whose basic characteristics would include relatively low-cost small Earth terminals easily and inexpensively co-locatable with user premises and with relatively inexpensive up-links for interactive service, linked to a variety of redistribution systems, and providing specialised social services to specific sub-groups of the public.

While it is too early to define the technical parameters, markets, or organisational arrangements for such a satellite system, efforts are underway, particularly by the non-profit Public Service Satellite Consortium, to clarify such issues and provide the groundwork which will be necessary to the implementation of such a system. WG-D's deliberations provided a necessary component in the US policy planning activities. Their recommendation that options for the later development of high-power specialised social service distribution systems for direct-to-home broadcast should be kept open gave further impetus to the desire for evolutionary planning.

Working Group E was concerned with International Non-Technical Implications. Its report reviewed the continuing consideration of direct satellite broadcasting by such international entities as the United Nations General Assembly and its Committee on the Peaceful Uses of Outer Space, UNESCO, and the regional broadcasting unions, both individually and collectively at the World Conferences of Broadcasting Organizations. It was concluded that the 1977 WARC is not an appropriate forum in which to resolve the political, social and cultural problems being worked on elsewhere.

It is recognised that the European countries in Region 1 favour a predetermined orbit and frequency assignment plan for the broadcasting satellite service in that Region. Such an approach would preclude the necessity for such detailed coordination procedures as the USA is urging, at least for intra-Region 1 considerations. However, such comprehensive procedures are required for the evolutionary planning approach which the USA urges for Region 2. The 1977 WARC provides an appropriate opportunity to incorporate the broadcasting satellite service in the 11.7-12.2 GHz band in a revised Article 9A; the 1979 WARC may choose to further modify 9A to include all the broadcasting satellite bands.

The US proposals will require careful study by all 1977 WARC participants who wish to understand them and the motivations and concerns from which they stem. Many who are anxious to "get on with the job" will be attracted by the apparently "simpler" approach of making decisions in Geneva in January 1977 which will assign frequencies, orbit positions, and polarisation patterns to all concerned administrations with little study of how and when – if ever – these allocations are to be activated or to what degree such decision-making might constrain satellite services from reaping the advantages which future technological developments are certain to make possible.

To some critics, more emotionally charged than technically oriented, the US evolutionary planning approach may be decried as "laissez faire" masquerading behind a mask of technical jargon. The notion that the highly industrialised nations will, if not constrained, pre-empt all of the useful satellite slots and foreclose this powerful new technology for their less industrialised neighbours on this Planet Earth still persists from the earliest debates about space communication. But any cursory study of the new opportunities offered by the 12 GHz band and its potential capacity in terms of both spectrum and orbit will reassure sceptics that such is not the case.

At the 1977 WARC, Region 2 will be unique. Here the heart of the matter is the problem of accommodating two space services in the 12 GHz band; the matter of developing terrestrial 12 GHz services is not a pressing problem. In North America, the band is already being used on an experimental basis for broadcasting to community receivers by the Communications Technology Satellite. With CTS, Canada and the United States have already taken the first steps toward developing broadcasting satellites for health, education and social services in this band.

Operational satellites, both fixed service and broadcasting service, are planned for the near future. Satellite Business Systems plans a fixed satellite service, but one which will capitalise on the opportunities the 12 GHz band offers for small Earth stations which can be located on the user premises, even in the electromagnetically "noisy" environments of major metropolitan areas. In satellite broadcasting, Telesat Canada has already placed an order for a follow-on to the present Anik series which will have two high-power television transponders in the 12 GHz spectrum. The Public Service Satellite Consortium is actively exploring the possibility of an operational or proto-operational broadcasting satellite in both the 2.5 GHz and 12 GHz bands.

In attempting to make decisions about the development of this important new orbit-spectrum resource, many things are not clear. That very fog is perhaps the only thing we can all perceive vividly. And, as moving through a fog, it seems wisest to make haste with caution and, at least in Region 2, take an evolutionary planning approach. •

Japan Supports Individual Reception

Y Maki, Director General, Radio Communications Department, Japan

THE 1977 WARC on Space Communications allocated the 12 GHz band to the broadcast satellite service on the basis that it should share it with several other services. In Regions 1 and 3 the other services are the fixed, mobile (except aeronautical mobile) and terrestrial broadcasting services. In Regions 1 and there is added the fixed satellite service.

Region 2 has the additional constraint of a footnote to the Table of Allocations (having the same force as the Table itself) which says that terrestrial radio services in the 12 GHz band shall be introduced only after the elaboration and approval of plans for space services, and that the use of the band by the broadcasting satellite and fixed satellite services is limited to domestic services.

This footnote is important to those governments who intend to use the 12 GHz band for their terrestrial services before the introduction of a broadcasting satellite service. The ITU Plenipotentiary Conference which decided in 1973 that the WARC-BS should be convened not later than April 1977 considered that there was an urgent need in certain parts of the world to start using the 12 GHz band for terrestrial services.

The Plenipotentiary Conference believed the ITU's CCIR (International Consultative Radiocommunication Committee) would produce sufficient technical data for planning purposes at its 1974 General Assembly. It was not until an Interim Meeting in mid-1976, however, that the CCIR produced its technical data – about six months before WARC-BS is due to open. At that Meeting two major approaches to planning were suggested: complete *a priori* planning, and an evolutionary approach.

Governments were invited to provide the International Frequency Registration Board (IFRB) with their foreseeable requirements by 15 October 1976.

These different approaches and the time-scale are particularly significant because broadcasting satellites are still in the stage of research and development – in both technological and other aspects. Indian and Canada respectively have had and still are experimenting with broadcast satellites, but no operational systems are definitely planned. Each administration can not therefore do much more than claim a bit of the spectrum and the geosynchronous orbit, both of which are scarce natural resources.

The planning of the 12 GHz band for broadcasting satellites is needed to ensure its efficient and stable utilisation for the terrestrial services. In addition, if the frequencies and orbital positions assigned to all countries are clearly shown in a plan, they would provide a good guide for the establishment of general radio communication systems, technical development, international cooperation and the establishment of each country's domestic communication policies.

In Japan, we are engaged in a project for a medium-scale Broadcasting Satellite for Experimental Purposes (BSE), the launching date of which is expected to be the end of February 1978. The project's objectives include:

(a) Tests on the transmissions of TV signals;
(b) Measurements of the effect of rain on the propagation of 12 GHz radio waves;
(c) Evaluation of the satellite's on-board equipment and ground terminals;
(d) Experiments in frequency sharing with terrestrial communications;
(e) Experiments in the techniques of satellite control;

In terms of a terrestrial broadcasting service, Japan is one of the world's most developed countries. Its 100 million people, living in a series of small islands, are highly information orientated. In response to the public's appetite for a variety of different channels of information, we are seriously considering using broadcast satellites.

One reason we are interested in the 12 GHz band is that it is especially convenient for the reduction of radiation over the territory of other countries (spillover). It is also possible to use extremely small and cheap receivers. Such small receivers, easily obtainable by the public, are essential for the popularity of a service with individual reception.

The situation differs country by country. In some countries, the terrestrial services are still developing and the balance of advantages between terrestrial and satellite broadcasting may not be obvious.

Some governments may favour a system of community reception. It is important, however, for a number of reasons, to establish the frequency assignment plan on the basis of individual reception.

Once a community-reception based plan has been established it will be increasingly difficult to introduce a system of individual reception. It would be especially difficult to do so after the other services that share the 12 GHz band with the community reception system have come into common use. We must be careful, in fact, not to establish such severe sharing criteria (as in the CCIR's third model) that the broadcasting satellite service literally cannot be based on a system of individual reception.

I believe it is vital that we plan the 12 GHz band for the broadcasting satellite service on the assumption that the individual reception system can be used without sharing criteria that are too severe. It must also be done on a world-wide basis.

We have to establish the assignement plan at a time when satellite broadcasting is at a premature stage. It is therefore highly desirable that we devise a plan, complete with the necessary procedures for notification and changes, that is flexible enough to cope with developments in both technology and operational practice. •

Canada Stresses Regional Differences

Andre Lapointe, Senior Assistant Deputy Minister, Department of Communications, Canada

THERE ARE SUBSTANTIVE differences between the ITU Regions in the allocations of frequencies and services in the frequency band from 11.7 to 12.5 GHz. For this reason, and because of widely differing requirements, there are also very great differences in the objectives which various countries hope to achieve at the forthcoming Conference.

In so far as the broadcasting satellite service is concerned, the band extends from 11.7 GHz to 12.5 GHz in Region 1 (primarily Europe, Africa and the USSR), but only to 12.2 GHz in Region 2 (the Americas) and Region 3 (most of Asia other than the USSR and Australia). In addition, the Radio Regulations permit various terrestrial services to share the band in all Regions; in Region 2, it is shared also with the fixed satellite service. Indeed, in Canada, in conformity with our position at the 1971 WARC, the frequency band 11.7 to 12.2 GHz is reserved exclusively for the space services; ie, for broadcasting and fixed satellites and for domestic use in accordance with the relevant footnote to the ITU Table of Frequency Allocations.

Various footnotes to the Table of Frequency Allocations, which are applicable to all Regions, have the effect of preventing the planned development of terrestrial services in the frequency band until plans have been approved for the corresponding space services. Thus, the implementation of terrestrial systems in this band, which is considered to be a pressing need by many countries of Western Europe, cannot be carried out until planning for the broadcasting satellite service has been completed. In the case of Canada, and for many other countries outside Region 1, no such urgency exists although planning cannot be carried out by any one Region without affecting others.

Service Requirements

The broadcasting satellite service provides a communications service from space stations which is intended for direct reception by individual or community receivers. Technology has now advanced to the stage where broadcasting from large high-power satellites to small, relatively inexpensive receiving installations can soon be achieved, though it may be some years before such systems are in widespread use. In Canada, however, in addition to our interest in the broadcasting satellite service, both for the densely populated areas of the south and more remote regions of the north, there is also a great deal of interest in the use of the 12 GHz frequency band for the fixed satellite service (although planning for this fixed satellite service is not within the competence of the conference). The band offers certain advantages over other bands allocated to this service, particularly in those areas in which extensively developed terrestrial systems share the same frequencies. For example, since there are no specific power limitations imposed on the satellites which use the 12 GHz band, Earth stations having comparatively small antennas can be used to the extent permitted by efficient orbit utilisation. Also, because of the absence in Canada of terrestrial services in this band, there will be no difficulty in co-ordinating the locations of transmitting and receiving Earth stations; this should allow Earth stations in the future to be located in or near major population centres.

A Huge Country

While, in terms of population, almost all Canadians have access to television broadcasting in at least one of the two official languages, there are serious deficiencies in the geographical or economic factors. There are large areas of the country in which there are small communities widely separated by inhospitable terrain and where access to reliable telecommunications, let alone television broadcasting, does not generally exist. Furthermore, Canada consists of many regions with great social, cultural and economic differences, for which provision must be made in the planning of operational communications and broadcasting systems.

Canada's present system of terrestrial television broadcasting has evolved as a mixture of services provided by both private and public undertakings, and individual stations and networks, to which has been added more recently the services provided by a number of educational broadcasting stations for which the provinces have jurisdiction. Any study of requirements in Canada for the services that can be provided by broadcasting satellites in the future must take into account both intention and extension of service. Because of the need to consider various factors such as expectation, jurisdiction, the diversity of application, and cultural and linguistic differences, Canadian requirements for the broadcasting satellite service are anticipated to amount to several channels per service area. In turn, the coverage areas will be determined by considerations of the available technology, the existence of a number of time zones, linguistic and cultural affinities, programme requirements, etc.

Canadian Experience

Canada has had a domestic commercial satellite communications system in operation for several years in the 4 and 6 GHz band. Owned by Telesat Canada, the system now comprises three satellites called Anik, the first of which was launched in November 1972, and a large number of Earth stations of various types. It provides television distribution to eight regional centres of the Government-owned Canadian Broadcasting Corporation, each with an uplink capability, and to a large number of additional stations for television reception at slightly reduced quality in the CBC Remote Service. In addition, the system is used for heavy-route telecommunications services between major southern cities, medium-route

services to two larger northern centres, and thin-route service to a number of very small northern communities.

Canada is also currently participating in a major experimental programme involving the Communications Technology Satellite (now called Hermes) which was designed and built in Canada under an agreement between Canada and the USA. This high-power satellite, launched in January 1976 and equipped with a 200 watt travelling-wave tube amplifier (provided by the USA) transmitting at 12 GHz, is providing information on the application of new technology to communications problems and on the application of telecommunications to the delivery of social services as well as to the socio-economic development of remote areas. The experiments being conducted include the demonstration of direct television broadcasting for individual and community reception in various areas, as well as the provision of network television, interactive television for formal and non-formal education, real-time medical consultation, information retrieval, and two-way voice communications using small terminals. The results of these experiments will directly affect the Government's policy for future development of telecommunications services in the middle and northern regions of Canada.

Recently, Canada has provided advance notification to the ITU of Telesat Canada's intention to place in service by 1979 a Telesat B-1 satellite, operating in the 6 and 4 GHz bands, which will also provide an experimental communications capability in the 14 and 12 GHz band.

Amending the Radio Regulations

The Canadian proposals to the 1977 WARC-BS were sent to the ITU on September 15, 1976 and have subsequently been distributed as Conference Document No. 9, dated 26 September, 1976. These proposals are based on the premise that the conference will undertake to amend certain portions of the Radio Regulations. It is our opinion that the International Telecommunication Convention is not only permissive with respect to the revision of the Radio Regulations by a WARC, but that the conference, if it so decides, is competent under the convention to make such changes; this was the intention of the 30th Session of the ITU Administrative Council where the agenda was drawn up. Certainly, in our opinion, if the orderly planning of the broadcasting satellite service is to proceed, it will be necessary to make certain changes to Article 7 of the Radio Regulations. In addition it seems desirable to us to bring the co-ordination, notification and recording of broadcasting satellite assignments in the 11.7 to 12.5 GHz band within the Radio Regulations. The recommended changes to the Radio Regulations are described in detail in the Canadian proposals.

It is the Canadian position that the establishment of detailed orbital and frequency plans in Region 2 may be premature since such action may result in an inefficiency in the overall use of the geostationary orbit and frequency spectrum in the light of the present pace of technological development. Moreover, it is likely that the needs of many countries in Region 2 have not yet been adequately formulated. It is recognised, however, that procedures must be developed at this time for the utilisation of the frequency band which will ensure the compatible development of the fixed satellite and broadcasting satellite services without imposing undue technological constraints on either. Such procedures must also satisfy, to the greatest extent possible, the projected needs of all Region 2 countries.

Concerning the development of criteria for sharing the 11.7 to 12.2 GHz band in Region 2 between the broadcasting satellite service and the terrestrial services, Canada considers that the development of broadcasting satellite systems for individual reception would severely restrict the compatible establishment of terrestrial services utilising frequencies in the same band. In addition, the interference from terrestrial systems of broadcasting satellite Earth station receivers for individual reception would be difficult to control.

There are four Resolutions contained as Annexes to the Canadian proposals. These resolutions, which embody the essence of the Canadian position, deal with (1) the convening of a future Region 2 conference for the further planning of the broadcasting satellite service, taking into account the requirements of the fixed satellite service, in the light of future technological developments; (2) the adoption of technical criteria, on an interim basis, for use in determining the orbital spacing of satellites and for calculating interference; (3) the need to employ techniques, to the greatest extent possible, to ensure maximum efficiency of use of the geostationary orbit and, frequency spectrum; and (4) a rudimentary plan, involving the division of the useful portion of the geostationary orbit for Region 2 into four segments. The Resolution concerning the interim division of the orbit is designed to ensure equitable allocation of resources to the fixed and broadcasting satellite services, in spite of the likely prior development of the fixed satellite service in this frequency band, until such time as a plan may be adopted or other arrangements are made. •

The Legal Implications of Satellite Broadcasting

E W Ploman, Executive Director, IBI

SATELLITE BROADCASTING INVOLVES numerous matters of law. The International Telecommunications Union (ITU), as the United Nations' specialised agency in telecommunications, is particularly concerned with the technical-regulatory aspects. More general international legal aspects, particularly the continuing work on the elaboration of space law, are dealt with by the Committee on the Peaceful Uses of Outer Space, which the General Assembly set up in 1959. This works mainly through its Legal Sub-Committee and other specialised bodies.

Its main achievement so far has been the elaboration of the set of legal principles for outer space activities which provided the basis for the Outer Space Treaty of 1967. This Treaty is the main international legal instrument in space law and the basis for all subsequent work on further agreements regulating more specific aspects such as the rescue of astronauts and the responsibility for damages caused by space activities. It is also the basis for the current work on a moon treaty and on legal principles for satellite broadcasting.

After some preparatory work by a special Working Group on Direct Broadcast Satellites, the question of legal principles was put to the Legal Sub-Committee which, in 1975, managed to formulate a number of articles. It based the 14 articles on four proposals tabled by Argentina, Canada/Sweden, USA and the USSR. At that stage, any outstanding issues had been presented in the form of alternative wordings and square brackets to indicate the lack of agreement. This ordering and clarification of the issues, providing a clear overview of the material to be negotiated, proved to be most useful to the discussions of this year.

At its meeting in May 1976, the Legal Sub-Committee was successful in reaching agreement on the text of the nine following principles: purposes and objectives; the applicability of international law; rights and benefits; international co-operation; State responsibility; the duty and right to consult; the peaceful settlement of disputes; copyright and neighbouring rights; and notification to the United Nations.

In view of the progress reached in related areas, the Sub-Committee decied that there was no further need to formulate principles relating to spillover and disruption (they were also held to be adequately covered by the ITU regulations). These principles have therefore been deleted.

Agreement Likely in 1977

The Sub-Committee's work is now focussing on the three remaining articles relating to the inter-locking questions of concept and participation, programme content and unlawful broadcasts. It seems possible that a compromise agreement may be reached next year.

There are three main positions. The *USA and some Western countries* maintain that a rule of prior consent should not be necessary for television broadcasts via satellite from one country to another.

The *Eastern European countries and some developing countries* stress the need for rules which would imply explicit consent for every individual programme. This group wish to include the two principles on programme content and unlawful broadcasts as a complement to the rule of prior consent.

Canada and Sweden Gain Support

According to the *Canada/Sweden* position, prior consent should be required for the establishment of a satellite system for broadcasts into another country but not for each single programme. This position has now been explicitly supported by a range of countries including Argentina, Austria, Australia, France, Iran, Mexico and Nigeria.

It should be noted that some of these positions have undergone certain modifications and clarifications since being first put foward. The US position was modified last year by a recognition of the need for legal rules and by proposals for notification and consultation. These, however, were not regarded as sufficient by other delegations since the proposed consultations would not provide a guarantee for reaching a mutually acceptable agreement.

Unlawful Broadcasts

There are also indications that the position maintained mainly by the USSR and the Eastern European and certain other delegations is being softened. In particular, it seems important that the USSR delegation declared that the detailed and far-reaching proposals concerning programme content and unlawful broadcasts might be "simplified" and expressed in "more general terms". The Canadian and Sweden delegations have also made several clarifications. Since the principle of prior consent refers to the establishment of direct broadcast satellite systems, it should be compared to the normal licensing procedures that exist in all countries for the establishment of domestic television systems. In this perspective, the principle of participation means consultation and negotiation which would have to cover a diversity of situations encountered throughout the world and can therefore only be expressed in general terms at the international level.

The Outer Space Committee has recommended to the General Assembly that the Legal Sub-Committee should continue to consider "as a matter of high priority" the elaboration of principles for satellite broadcasting as well as the draft treaty relating to the moon and legal implications of remote sensing of the earth from space. The question of the definition and/or delimitation of outer space activities will remain on the agenda of the Sub-Committee but with a lower priority. •

The Space Age Comes to Cameroun-Briefly

Alan J Warr

UNBEKNOWN TO THE vast majority of its six million population, the African Republic of Cameroun was recently a participant in a satellite technology demonstration. The US National Aeronautic and Space Administration's applied technology satellite (ATS-6) was used to transmit colour television pictures from Washington, DC, to Yaoundé, the capital, and thence to two major towns in West Cameroun, on October 5. The satellite was recently in the service of India's SITE project but its rockets were fired on 1 August to move it from its geostationary orbit above Lake Kenya (35°E) to a new site on the Pacific seaboard of the USA (130°W) which it should reach by the end of this year.

The demonstration was the brainchild of NASA communications experts and the administrator of the Agency for International Development, Daniel Parker. Project AIDSAT, as it is known, makes use of the satellite's drift period across the Atlantic Ocean. While wishing to show how spacecraft could be used to ease communication and other social problems, AID's initiative was also prompted by the prospect of transferring telecommunications technology to the Third World. As Secretary of State, Henry Kissinger has suggested: "The USA has already shared with developing nations information from our earliest resources survey satellites. We are now prepared to undertake much larger programmes to apply this technology".

Cameroun was among twenty-seven nations visited by one of three AIDSAT teams. Demonstrations had already taken place in the Far and Middle East and in other parts of Africa. The team repeated the performance in nine South American states.

The day before the demonstration, NASA technicians flew in from Mali and established a transmit-and-receive terminal (TART) on top of the National Assembly building, in Yaoundé. Receive-only terminals (ROT) were installed at Victoria and Douala. The TART antenna is a ten-foot non-steerable dish, with twenty watts transmitting power. At a height of 850 metres, the dish could "see" ATS-6 as it orbited 22,500 miles above Brazil, fourteen or fifteen degrees above the horizon. The total cost of the TART is about $30,000 at current prices.

Goddard space flight control and a panel of AID experts in Washington, DC, were connected to Yaoundé via the transmitting station at Rosman, North Carolina. Six GHz (C-band) signals from Rosman were translated by ATS-6 into the S-band (2,569 MHz) which were received and retransmitted to the ROTs at 2,250 MHz.

A revealing feature of the demonstration was the hurried planning (AID in Cameroun had two weeks to prepare) and the fact that it was concerned only with the technical aspects. Three videotapes made by NASA were transmitted to illustrate how satellite technology could help developing countries in the fields of educational broadcasting, disaster prediction and remote sensing. These same films are being shown in all the sites without any regard to economic or cultural diversity (compare the requirements of Bangladesh and Morocco, for example). The second part of the programme was a cultural film made on the morning of the demonstration day. The final session was allowed for question and answers between an inter-ministerial panel and the US experts.

The assembly hall was less than half-full during the four hour transmission and attendance had dwindled to less than fifty by the time the panel came on. Unfortunately, sound reception was erratic and, due to an early failure at the Rosman transmitter, the Anglophone population in Victoria heard the film commentary in French only.

Nonetheless, it was the transatlantic seminar which proved most interesting. Careful inquiries from representatives of the Cameroun government pinpointed problems involved in increasing the "scholarisation" of the population using educational technologies. Would television, for example, displace already trained teachers; if not, would it be suitable for the technical instruction which is an emphasis of the nation's fourth 5-year Plan (1976-80)? The Post Office asked who would have the ultimate control over the data collected by earth resource satellites (Landsat is transmitting 1,800,000 bits of information per day, equivalent to 180 full colour plates). Dr Block and his panel of experts allayed all such fears. One question, though, remained unanswered — do the operational requirements of a communication satellite system presuppose a level of educated manpower which it is the satellite's task to help provide in the first place? Problems of technical know-how and manpower circularity often accompany the use of sophisticated technology and technicians along with the equipment can be avoided, and this implies a form of technological imperialism.

Perhaps the AIDSAT project is best summarised by the opening statement of the Minister of Posts & Telecommunications, Emman Egbe: "We see in the whole demonstration the committment of the United States to transfer space-age and telecommunications technology . . ." •

Major US Copyright Act Signed

ONE OF THE most important recent events in copyright legislation is the new US Copyright Law which was signed by President Ford on 19 October.

The present Copyright Law dates back to 1909. The movement for a general revision of the copyright Law began in 1955 with a series of extensive studies of major copyright problems. This was followed in 1961 by a report by the Register of Copyrights on general revision and by the preparation of a preliminary proposed draft bill. The first legislative hearings were held before a Sub-Committee of the House Judiciary Committee in 1965.

In 1967, the House of Representatives passed a revised bill, whose major features were similar to the bill just signed. Then followed another series of extensive hearings before a Sub-Committee of the Senate Judiciary Committee: considerable delay was caused by an extended impasse on the complex and controversial subject of cable television. The Senate did not pass the bill until 1974 and the differences in the House and Senate were not resolved until 1976.

The new law, which will come into effect on 1 January 1978, makes far-reaching changes in US copyright regulations.

Instead of the present dual system in which works are protected under common law before publication and under federal statute afterwards, the new law established a single system of statutory protection for all copyrightable works whether published or not.

The new rules provide for a longer duration of copyright; the establishment of a Copyright Royalty Tribunal; the payment of certain royalties, under a system of compulsory licensing, for the transmission of copyrighted works on cable television and by jukebox operators; a certain form of compulsory licensing for non-commercial transmissions by public broadcasters; changes in the rules concerning notification and registration; changes in the regulations of the scope and limitations of exclusive rights with regard to fair use and reproduction by libraries and archives etc.; and the creation of a national radio and television archive.

For works already in copyright, the new law extends the term of copyright to 75 years from first publication (keeping the system of renewal for periods of protection). For works created after 1 January 1978, copyright is extended to the author's life plus 50 years.

The law includes a number of provisions regulating the copyright problems that arise from the many new technologies that did not exist in 1909 and which had only partly been resolved by later amendments. It specifically provides rules in connection with cable television, computers and similar information systems, microfilm and photocopying machines.

With regard to cable, the law provides a system of compulsory licensing and payments of royalties for the "secondary" transmission of copyright works. The amounts are to be paid to the Register of Copyrights for later distribution to the copyright owners by the Copyright Royalty Tribunal. This system of compulsory licensing was opposed by the National Association of Broadcasters who argued that rates and payments should be established in the market place.

Non-commercial transmissions of "music and graphic works" by public broadcasters will also be subject to a system of compulsory licences, under terms and rates established by the Tribunal.

The present exemption of jukeboxes is abolished. At present, a jukebox's performance of copyright music is not liable. From 1 January 1978 jukebox operators will have to pay a compulsory licence and an annual royalty fee, which will also be paid to the Register of Copyrights for later distribution.

The new law also makes a number of changes in the present system providing compulsory licencing for the recording of music.

With regard to the limitations in exclusive rights, some of the most interesting provisions in this context concern "fair use" and reproduction by libraries and archives.

The new law adds a provision which specifically recognises, as a limitation on the exclusive rights of copyright owners, the principle of "fair use" of copyright of works for such purposes as criticism, comment, news reporting, teaching, scholarship or research. The law also indicates factors to be considered in determining whether particular uses fall within this category.

The law also specifies circumstances under which the use of single copies of copyrighted works by libraries and archives for non-commercial purposes do not constitute an infringement.

An interesting novelty is the Copyright Royalty Tribunal whose purpose is to determine whether certain royalty rates are reasonable and, if not, adjust them. It will distribute royalty fees deposited with the Register of Copyrights (fees for cable transmission, jukebox performances etc.

The Tribunal will have five members (to be known as Commissioners) who are to be appointed by the President with the consent of the Senate for seven year periods. The Commissioners will elect the chairman, who will serve for one year. The Tribunal will be closely linked to the Library of Congress.

One section of the law, described as the 'American Television and Radio Archives Act', requests the Librarian of Congress to "establish and maintain . . . a permanent record of the television and radio programmes which are the heritage of the people of the USA and to provide access to such programmes to historians and scholars". The Librarian is asked to consult with interested organisations and then to acquire "programmes transmitted both in the USA and other countries that are of present or potential public or cultural interest".

As a result of the new law, the USA may be able to accede to the Berne Convention, the oldest of the international copyright conventions. It establishes a higher rate of protection than the Universal Copyright Convention, to which the USA has already acceded. • EWP

Teletext Gets Official Go-Ahead

THE UK HOME Office has authorised the BBC and ITV to operate full teletext services. The decision follows a two-year experimental period, and enables both the BBC's Ceefax and ITV's Oracle to continue until 1979. The decision to continue thereafter depends on the Government's response to the Annan Committee on the Future of Broadcasting.

The two systems, which are technically compatible, use the flyback period of the TV signal to transmit alpha-numeric data such as news, information and schedules.

A third system, the Post Office's Viewdata, links the TV channel's video capacity to the telephone network's audio capacity to provide a simple interactive system with rather more scope.

Ceefax transmissions started in 1973 (on BBC1 only); the BBC is now providing 100 pages on both BBC1 and BBC2. ITV has a much smaller Oracle service. Outside the BBC, ITV and trade fairs, however, there are very few decoders. Manufacturers are sensibly reluctant to commit themselves to produce special decoders until the service looks like being popular.

The BBC estimates, however, are doggedly optimistic. The latest is that "thousands of sets per month will be produced in the first quarter of 1977". Speaking at the recent Video '76 conference, Bill Wood, Head of BBC Engineering Information, said that "informed opinion in the television receiver industry indicates that there will be at least 50,000 sets equipped to receive Ceefax (and Oracle) by the end of next year". The cost is expected to add about £75 to the price of a TV set.

The Post Office's Viewdata system is very different, and may turn out to have several advantages over Ceefax/Oracle.

First, it is interactive. Users can have "conversations" with the central computer facility via the telephone network. Secondly, the data base is much wider and more detailed. As against Ceefax's 100-odd pages on BBC1 and BBC2, Viewdata already has several thousand pages and will provide at least 70,000 for the market trial planned for 1978. Furthermore, whereas Ceefax and Oracle takes an average of 10 seconds to call up a page (and the actual time often *seems* much longer), Viewdata's access is virtually immediate and designed never to exceed 3 seconds.

A major difference is the cost. The BBC hope to pay for Ceefax's editorial facilities by getting a (further) addition to the licence fee. It is expected that in its imminent negotiations with the Home Office for an increased fee, and in discussions about the possibility of a fixed "incremental" fee, the BBC will point to Ceefax as an extra responsibility that it has incurred in the course of carrying out its duties. The ITV companies find the question of revenue for Oracle's editorial department rather more perplexing, since the system is not geared to advertisements (except crawls across the bottom of the page). But the significant point is that both the BBC and ITV will be paying for their systems from a general budget, so to speak, and the services will be "free" to the viewers.

Viewdata, in contrast, will have to be paid for by the users as and when they use it. There are three cost components. The cost of the local call to "call-up" the system; the Post Office's overheads; and, the largest factor, the cost of the information.

The distinction is necessary because the the Post Office (again, unlike the BBC and the ITV companies) is a common carrier. The information on Viewdata is provided by outside organisations which, naturally, may charge for their information. Some organisations may charge a relatively high fee; one would expect to pay a fairly substantial fee for a comprehensive and continuously updated list of Stock Exchange prices. Other organisations may simply charge enough to cover their overheads. And others (for instance, charities and government departments) may decide not to pass on any costs and provide the information "free".

Some eighty 'Information Providers', as the Post Office calls them, are taking part in the pilot trial which started in January 1976. A market trial, with about 1,000 terminals, should start in March 1978 and, if successful, could lead to a full public service in 1980.•

Folk Communications

AFTER A SUCCESSFUL two year series of performances and meetings, an international association of folk artists and communicators has proposed a substantial project to mobilise folk communication's many resources.

The International League of Folk Arts for Communication and Education (FACE) held its most recent meeting at the the UN Habitat Conference on Human Settlements in Vancouver in June.

The meeting involved artists, folklorists, communicators and educators in an intensive series of performances and exhibitions. For many people, FACE's nightly performance was one of the Habitat Forum's most memorable sights.

The dances, songs and pantomime were linked to seminars, workshops and discussions. Participants included 78 delegates from 23 countries in Asia, the Arab region, Latin America, the Caribbean, Africa, North America and Europe.

The Vancouver encounter was another step in FACE's total programme towards its goals of "(1) achieving the worldwide mobilisation of folk communication resources and leaders and (2) facilitating the integration of their unique and crucial contribution into development programmes".

Following Vancouver, the Population Institute has proposed that FACE's next project should be: "Mobilising and Training Folk Communicators as a Key Resource in Population and Development Programmes".

The preface of their proposal is a quotation from the IBI seminar on Communication and Development which was held in Ibadan in 1974: "For the next few decades, most developing societies will be mainly rural. They will continue to be poor. The resources for communication with the rural areas will continue to be inadequate in view of the size of the problem. Therefore, all possible media and channels of communication must be utilized to support the development process."

The point of the FACE proposal is

that all societies have unused resources of folk arts: "Within all cultures and societies there exists a wealth of folk culture, art, crafts and communication. Only recently has it begun to be understood that this rich reservoir constitutes one of the greatest resources to further development concerns within the nations. If this wealth is to be made available to development programmes, however, it is necessary to teach folk artists and leaders how to take these resources and authentically focus them upon the development needs and programmes of their nations. It is for this "teaching" task – as well as to further the integration of folk resources into development programmes – that FACE (Folk Arts for Communication and Education) has been brought into being."

There are five specific objectives. The first, *Roster*, is to use existing resources to develop a comprehensive roster of folk communication leaders and structures and to develop working relationships with all of them.

The second objective, *Network*, is to create a worldwide network interrelating all folk communication programmes and to exchange information. Third, *Training*, is the selection of one country in Asia, Africa and Latin America for "intensive attention", with the goal of developing a model within each region.

The fourth objective, *The Regions*, is to assist the development of regional programmes of folk communication for population and development; and the fifth, *Integration*, is to "integrate all of the above in existing family planning and population programmes, development education programmes and the mass media".

Building on the successful Educational Theatre Association of the Philippines (PETA), the FACE project will concentrate on using grass-roots programmes to enable people to understand their indigenous, local, culture.

This will be done by training "a new breed of artist/teachers/communicators" who are "prepared to join cultural resources to development needs".

New York has been chosen as the most suitable location for the pilot project. About 30 trainees will attend an eight-month integrated seminar/workshop/laboratory. The cost of the project is reckoned to be about $131,000. •

Books

Annual Report 1975/6 (Independent Broadcasting Authority, 70 Brompton Road, London SW1; £1.50). Detailed annual report and commentary of UK commercial TV and radio.

Communications and Rural Changes (Asian Mass Communications Research and Information Centre, 39 Newton Road, Singapore 11; S $1400 in Asia, S $21.00 outside Asia). Edited by P R R Sinha. Report of an AMIC conference on 'Communications and Change' held in Bangkok in 1973. The three main sections contain views and information from Administrators; Practitioners; and Researchers.

Communication Policies in Yugoslavia (UNESCO, 7 Place de Fontenoy, 75700 Paris; price on application) by Zdravko Lekovic and Mihalo Bjelica. This useful series continues with a historical analysis of Yugoslavian mass communications policies.

Cross-Cultural Broadcasting (UNESCO Reports and Papers on Mass Communication No. 77, 7 Place de Fontenoy, 75700 Paris; price on application) by Eduardo Contreras, James Larson, John K Mayo, Peter Splash, Institute for Communication Research, Stanford University. Covers cultural, linguistic, psychological and political effects. The report's principal implication is "the need for more information about cross-cultural broadcasting's affects."

Current British Research on Mass Media and Mass Communication (Centre for Mass Communication Research, University of Leicester; price on application) edited by Connie Ellis. A new edition of this useful list of current and recently completed research.

Development Communication (Asian Mass Communication Research and information Centre, 39 Newton Road, Singapore 11; price on application) edited by Guy de Fontgalland. A 102-page report on the AMIC 'Study Seminar' held in Singapore last April.

Education and the Mass Media in the Soviet Union and Eastern Europe (Praeger Special Studies, New York) edited by Harasymin Bohdan. One of several volumes of papers presented at the International Slavic Conference held in Alberta, Canada in 1974. Subjects include "Novy Mir"; Socialist press-agencies; Yugoslavian press agencies; USSR public opinions surveys; and education in the USSR and Eastern Europe.

Information Imbalance in Asia (Asian Mass Communication Research and Information Centre, 39 Newton Road, Singapore 11, S $2.00 in Asia; S $3.00 outside Asia) by Asuk Mitra. A brief but excellent account of Western and Asian news agencies, and a plea for Asia countries to be self-reliant; originally presented at an AMIC Conference on Information Imbalance in Asia held in Sri Lanka in 1975.

Mass Media and Socialisation (International Association for Mass Communications Research, c/o Centre of Mass Communication Research, University of Leicester; price on application) edited by James Halloran. Two chapters on "Changing Perspectives in the Study of Mass Media and Socialisation" (Robin McCron) and "Mass Information Processes and Problems of Personality Socialisation" (Professor Yury Sherkovin); a selected bibliography (Dr. Nalery Pisarek); and a note "Towards a Global Systems of Documentation and Information Centres" (Professor Kaarle Nordenstreng).

Mass Media in CMEA Countries (International Organisation of Journalists and Edition Interpress, Budapest; price on application). The CMEA is the Council of Mutual Economic Assistance; its members are Bulgaria, Czechoslovakia, Hungary, Mongolia, Germany (DR), Poland, Rumania, USSR and Cuba. This 255-page book is an extremely useful, factual, report compiled by IOJ members in the respective countries: The statutes of the various journalists' associations; mass communication acts and regulations; circulation figures, etc. printed in full.

Oy Yleisradio (Department of International Relations and Information, Kesakatu 2, PL 95, SF-00251 Helsinki 25; free). On the occasion of its 50th anniversary, the Finnish Broadcasting Company has produce an illustrated history of the development of Finnish radio and television, particularly its foreign relations, and a brochure about its activities today. They can both be obtained from V Zilliacus, Head of International Relations, at the above address.

Regulation of Direct Broadcasting from Satellites: The UN Involvement (Praeger Special Studies, London; £8.15). by Benno Signitzer. History of the UN involvement, and analysis of the Outer Space Committee's political and legal processes. The aim of the author (who was at Bowling Green State University, USA, but has now returned to Salzburg University, Austria) is to "establish the position of Committee members on a free flow-control continuum" and to suggest the need for new concepts more suitable for the new technologies and their legal and political qualities.

Der Rundfunk in Afrika Anfang der Siebziger Jahre: Strukturen und Daten (Broadcasting in Africa in the Early Seventies: Structures and

Data) (Department of Mass Communication, University of Salzburg, Sigmund Haffer Gasse 18, A-5020 Salzburg; $5.00 plus postage) by Charlotte Deitrick. The third of a series of reports (arbeitzberichte) published by the Department. The report, which evolved from a PhD thesis, is based on a thorough review of the literature (before Sydney Head's 'Broadcasting in Africa' had been published) and the analysis of a questionnaire sent to 56 countries.

The Shadow in the Cave (Quartet, London ISBN 0 7043 3508 X; £2.50) by Anthony Smith. Revised paperback edition of the author's excellent 1973 study of the broadcaster, the audience and the state in the UK, France, USA, Japan and the Netherlands; plus appendices containing the author's "The Management of Television in a Democratic Society", first presented to the Council of Europe and his submission to the Annan Committee on the Future of Broadcasting on a National Television Foundation.

Television and the Future Needs of the Public (Royal Television Society, Tavistock House North, Tavistock Square, London WC1; price on application). An edited summary of the proceedings of the RTS 1975 Convention. Authors include Howard Steele, Director of Engineering, IBA; Sir Charles Curran, Director General, BBC; Professor John Vaizey, Brunel University; and Richard Dill, Controller, International Relations, ARD.

Television in the Corporate Interest (Praeger Special Studies, New York; price on application) by Richard Bunce. A neat analysis of US broadcasting as a business, with particular stress on current industry ideas about pluralism and diversification.

Television sans Frontieres: Un Problem de Cooperation Internationale (Telvision without Frontiers: A Problem of International Cooperation) (Economica, Paris; price on application) by Simone Courteix. A study of the conflict between traditional state sovereignty and the international interdependence of broadcasting organisations.

Videology and Utopia: Explorations in a New Medium (Routledge and Kegan Paul, London; £4.50) by Alfred Willener, Guy Milliard and Alex Ganty. A "phenomenological" exploration of social uses of portapaks, which has suffered somewhat in the translation from the original French.

Periodicals

Broadcast (111a Wardour Street, London W1; 35p single copy). The **25 October** issue of Britain's broadcasting weekly has a rare and informative report on USSR TV and film; mainly technical, production and training aspects. The **1 November** issue has a 44-page illustrated supplement on the early years of the BBC, with some rare pictures from EMI's own files of 1930's equipment and programmes.

Development Dialogue (Dag Hammarskjold Foundation, 2 Ovre Slottsgatan, S752 20 Uppsala; free) **1976:2**. Special 124-page issue: "Information and the New International Order".

Educational Broadcasting International (British Council, Tavistock House South, Tavistock Square, London WC1 £3.50 single copy). **September**. Six articles on "Media in Medical Education", plus reports on Mexico and the Free University of Iran.

Fernsehen und Bildung (Verlag Dokumentation Munchen, Possenbacherstrasse 2, Postfach 71 100 g, 8000 Munich 71; DM 36 pa). **10:1/2**. Special 134-page issue on "Sesame Street Internationally."

Indian Journal of Adult Education (Indian Adult Education Association, 17-B Indraprastha Marg, New Delhi 110001; Rs 2.00 single copy). **XXXVII, 3**. Special issue on "Continuing Education".

Information and Meinung (Information and Opinion) (published jointly by the Austrian Journalists Union and the Departments of Mass Communication at the Universities of Vienna and Salzburg, c/o Noe Pressehaus, Gutenbergstrasse 12, A-3100 St. Poelten; Sch. 35.00 or $2.00 pa). A new Austrian quarterly on mass communication and journalism, with research articles, comment and news.

The Listener (BBC, 35 Marylebone High Street, London W1; 35p single copy) **14 October**. Special issue: "Broadcasting Education Survey".

MIA: Media Information Australia (MIA, PO Box 1106, North Sydney, NSW, Australia 2060; $A12 pa). This is the first Australian quarterly to deal with all aspects of media, information (tele) communications, surveys, new Australian books, research in progress. The editor is Professor Henry Mayer, Department of Government, University of Sydney, NSW 2060, Australia. The first issue was June 1976. The MIA is published by the Media Information Research Exchange, a coordinating body of several "non-commercial" research organisations including the Australian Broadcasting Commission, Australian Broadcasting Control Board, Australia Council, Film Censorship Board, Film and Television School and the Posts and Telecommunication Department.

It is a well-produced and comprehensive (245pp) list of publications and events, mostly of local interest but a substantial amount deserving attention from others outside Australia.

The Media Reporter (39 Legh Road, Sale, Cheshire; £1 single issue). **Autumn**. The first issue of a new quarterly journal about UK media studies, mass communication and journalism training in the press, radio and television.

Other

Film-Making in Developing Countries (Dag Hammarskjold Foundation, Ovre Slottsgatan 2, Uppsala). A written report, **Film-Making in Developing Countries 1: The Uppsala Workshop** (Skr 40) and a 16mm black-and-white film, **Highlights from a Film Workshop** Skr 500), based on a Workshop held in Uppsala in 1974. The book is edited by Andreas Fuglesang; the film is produced by Bo-Erik Gyberg, and is intended to be a visual supplement to the book.

International Association of Mass Communication Research (c/o Centre for Mass Communication Research, University of Leicester, Leicester; price on application). The papers delivered at the IAMCR's Tenth General Assembly (reported in the October issue) include: **Theories of Communication and Theories of Society** by Peter Golding and Graham Murdock, Centre for Mass Communication Research, University of Leicester,; **Mass Communication Research** by Lothar Biskey, Zentralinstitut fur Jugendforschung, Leipzig; **Where we are and where we should be going** by George Gerbner, Annenberg School of Communications, University of Pennsylvania; **The New Multi-National Educators** by Armand Mattelart, University of Paris; **Broadcasting, Politics and the State: The Independence/Impartiality couplet** by Stuart Hall, Director, Centre for Cultural Studies, University of Birmingham; **Studies Into Information Media and Cultural Institutions in the USSR** by Professor N Mansurov, Institute for Social Research, Soviet Academy of Science; **TV Etchings in the Minds of Latin Americans: Conservantism, Materialism, and Conformism** by Luis Ramiro Beltran, Communication Specialist, Representative for Latin America of the Division of Information Sciences, International Development Research Centre, Bogota, Colombia; and **An Analysis of the West African Wire Service of an International News Agency** by Phil Harris, Centre of Mass Communications Research, University of Leicester

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Facing the Technical Facts of Life

A TELEVISION news service which changes to electronic news gathering is not only making a technical decision but a programming one. Another news service may be equally sensitive to the purchase of video tape recorders: the decision to buy a 2" quadruplex or a cheapter 1" helical scan recorder may affect how many hours programming it can afford.

The electronic facts of life are important. Yet quite often their technical nature obscures their significance.

The allocation of radio frequencies is typical. A radio frequency is the life-blood of a radio service. Whether the frequency is allocated to broadcasting or to the military or the fixed satellite service, whether it is allotted to this country or that country, whether it is assigned to this station or that (or to both, in the hope that night-time interference won't be too great) is a large part of what electronic communication is all about. Yet the business of allocation, allotment, and assignment is a little-known process. The words themselves are jargon, deliberately chosen and defined by radiowave engineers and planners to differentiate between separate events. Abderrazak Berrada, a member of the International Frequency Registration Board, has said that the two Articles of the ITU's Radio Regulations which govern the Board's work, Articles 9 and 9a, are "so complex that only a small band of initiates can find their way through the maze of changes" (see this issue page 9).

There are countless reasons for the difficulty, but two predominate. First, the process of allocating frequencies and planning a radio service involves advanced mathematics and a high level of intellectual analysis which, second, it is extremely difficult to explain in anything but technical terms and planning jargon.

As a result many non-technical people are reluctant to become involved.

Yet the planning and allocation of radio frequencies (and the geostationary orbit) need a sustained, multi-disciplinary approach if we are to use these resources in the most appropriate and most democratic way.

A look at the various teletext systems now in operation in Europe, Japan and North America shows the extent of the problem. Given some knowledge of the principles of TV scanning, an assiduous reading of the technical literature and a fairly adventurous spirit, it is possible to gain an idea of the essential principles and a rough description of the different systems. But much more is needed before one can analyse, assess and criticise the systems and make appropriate plans and policies. A society whose engineers have produced two or three different systems clearly needs an informed and intelligent body of people to assess and plan them. Few societies are so lucky.

In the UK, the BBC, IBA and Post Office have independently developed three teletext systems. The two produced by the broadcasting organisations were sufficiently similar for the British Radio Equipment Manufacturer's Association (BREMA) to develop, with them, a set of common specifications. Today, both the BBC's Ceefax and ITV's Oracle are technically similar. Editorially, however, they are different and in the future they will be competitive. There will be several dimensions of competition: between Ceefax and Oracle; between Ceefax/Oracle and Viewdata; between teletext and other TV broadcasting; and between teletext and other media (particularly daily newspapers).

This competition is inevitable, although seldom analysed. Yet the implications are wide-ranging, to say the least. What will be Ceefax/Oracle's effect on the broadcasters' main news bulletins? Will many viewers prefer to watch teletext's on-demand 'News Headlines'. It is a question of degree. Teletext is highly unlikely to "kill" newspapers But it may take 20% of a newspaper's readers, with disastrous consequences for that newspaper's commercial viability and with reverberations throughout the entire industry. The changes would be cumulative, and could be more significant than those resulting from government communication policies. Governments would have to consider a wide range of policies with economic (subsidies, licence fees, etc) and social (demographic, industrial, etc) aspects.

It is not possible to wait until the engineers have developed the system before deciding how it can or should be used. The options may have been closed.

It is worth asking why the UK's Ceefax and Oracle are so different from Viewdata. Most of the reasons are directly attributable to one factor: the different traditions and duties of the sponsoring organisations. These different traditions have led to the same piece of technical inventiveness being exploited in two completely different ways. The broadcasters, who are responsible for the content of their programmes, have developed a one-way system whose editorial content they control. The Post Office, which is a common carrier and not responsible for its customers' messages, has developed a two-way system and left it open for others to supply the information content.

The point is, should organisations which were set up to deal with one task (whether radio or mail) so greatly affect the way in which teletext develops in the future? And if not, who is going to provide the alternative?

Likewise, the allocation and planning of radio frequencies raises numerous cultural and political issues which societies should tackle on a broad, multidisciplinary front.

The question is not simply about vested interests, or about new technologies, but about a society's ability to prepare itself for the technical issues of the day. • JAH